INSERVICE TEACHERS' USE OF REFLECTION, IDEATIONAL FLUENCY, AND CONDITIONAL LOGIC: AN EXPERT-NOVICE STUDY

BY

DENNIS NEAL BANKS

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insight and ability to keep growing. Education is truly a lifelong process.

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By

Dennis Neal Banks

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Chairman: J. Doyle Casteel
Major Department: Instruction and Curriculum

The purpose of this study was to explore the relationships between three variables of teacher discourse (reflection, ideational fluency, and conditional logic) and degree of expertise in the teaching of secondary social studies. Four populations of teachers were compared. Population membership was determined by years of experience, with those subjects having at least five years being further divided based on the type of teacher education program completed. Those who had graduated from a traditional four year program or had taken postbaccalaureate coursework to achieve certification were classified as Novices (traditional). Those teachers who had completed the fifth

year program at the University of Florida were classified Novices (nontraditional). Those subjects who had more than five years of experience were classified as Expert or Non-expert on the basis of independent observations conducted by a select panel using the Expert Teacher Evaluation Instrument. This instrument was used to quantify the ideal-type concept of the expert teacher. The sample consisted of 9 Novice (traditional), 10 Novice (nontraditional), 10 Experts, and 9 Non-experts.

Structured interviews were conducted with each subject, concentrating on their specific plans for the next unit of study. The variables measured were (a) reflection as the wait time between the end of the interviewer's question and the beginning of a substantive response, (b) ideational fluency as the total number of relevant ideas presented in response to the questions, and (c) conditional logic as the total number of instances of specific words or phrases.

The research addressed the differences between the various groups with regard to each of the variables, as well as the interaction between fluency and logic in regard to reflection. Multiple regression analysis revealed significant differences between the Expert and Non-expert groups on all variables. No significant differences were detected between the Expert/Novice (nontraditional) groups or the Non-expert/ Novice (traditional) groups on any of the variables. Significant differences were detected between other pairs on specific variables. No interaction between fluency and logic

was found. Inferences about the relationship between these variables and type of program and/or years of experience could not be drawn.

CHAPTER 1
INTRODUCTION

In this chapter, the research problem is presented. The rationale for the study is explained and placed within the context of the schools of research. Process-product research is described in both climatic and linguistic formats. Cognitive research in the areas of teacher judgment, thinking, content knowledge, and expertise are explained. The procedure of the study is outlined, hypotheses stated, definitions given, and limitations enumerated.

Statement of the Problem

In the 1960s, the major thrust of research into pedagogy was behavioral. Studies isolated certain characteristics of teacher behavior and searched for correlations with student achievement. This process-product approach was joined in the late 1980s and early 1990s by a more cognitively oriented approach, which emphasized the relationship between how teachers think and how they behave (Berliner, 1979; Clark & Yinger, 1977; Kennedy, 1991; Newmann, 1991; Shulman, 1986a, 1986b).

The cognitive processes involved in an action have been studied through individuals' verbal behaviors. Through this

"talk-about" methodology, where subjects are asked to describe what they do, the nature of expertise has been explored in fields such as medicine, sports, and law (Chi, Glaser, & Farr, 1988; de Groot, 1966, 1978), but not in education, a situation this study attempted to alleviate.

The purpose of this study was twofold: (a) to explore differences in the thought processes of novice and expert social studies teachers as observed through the manner in which they verbalized their actions, and (b) to study the planning processes of the novice teachers as they relate to the type of teacher education program in which they participated.

Rationale

Educational reform has been the watchword of the last four decades. Reforms have been proposed and either implemented or ignored to the same negative result. Many reasons have been given for this ineffectiveness (Cuban, 1990). The call for reform by President Bush, known as America 2000 (America 2000, 1991; Gough, 1991) is an outgrowth of these previous movements and hearkens back to many of them.

One of the dimensions of the current movement is a recognition that teachers have not been prepared to perform professionally in the classroom and school. A precursor to this theme can be found in the work of Smith (1969), where he

called for teacher preparation not just for some ideal of the real world, but for school institutions as they exist in the world that is realistically developing. He called for dramatic reform. By "dramatic," Smith did not imply the sense of total overthrow, but rather significant reforms based on an acceptance of the warnings of society.

Proponents of change are no longer content with calls for reform. They demand professional programs of study that will result in the development of professional teachers who are sufficiently strong to resist and overcome the obstacles imposed by conventional systems (Gage, 1989; Zeichner, 1991). Those concerned with teacher education are asked by proponents of this form of revolution to imagine both a better world and better teachers. The National Center for Research on Teacher Learning at Michigan State University, for example, is pursuing such a goal by defining "new territory" in the areas of public expectations for schools as well as taking a new theoretical look at the teacher as learner (Kennedy, 1991).

Prior to the 1960s, research on teachers and teaching concentrated on educational psychology and the facets of student learning, rather than teacher performance (Travers, 1963). A shift in interest to the teacher can be dated to the mid-60s and the work of Flanders (1960, 1970) on climate, Rosenshine (1969) on direct instruction, and Bellack, Hyman, Smith, and Kliebard (1966) on the language of the classroom.

Process-Product Research: Climatic and Linguistic

Process-product research may be divided into two categories for purpose of analysis: instructional climate and language of the classroom. The research of Flanders (1960, 1970) explored the variables of direct versus indirect teaching. By direct instruction Flanders referred to teacher lecture and consequent questions; by indirectness, he referred to divergent questions and teacher usage of student-generated ideas and feelings. In studies conducted between 1959 and 1967, the climate established by interactions between teachers and students was seen as a key influence in subsequent behavior of the students, as measured by the Flanders Interaction Analysis Categories (FIAC). Mainly interested in the effects of teacher behavior on student attitudes (though some measures of student achievement were also included), Flanders and his associates, as reported by Soar (1968), found that both styles of behavior (direct and indirect), when combined in the classroom, were more effective than either style used solely. They suggested teacher judgment as a critical aspect of planning.

Rosenshine (1969, 1971, 1979) was less convinced that the appropriate climate for learning is indirect and pursued research on direct instruction, emphasizing classroom language. In particular, he looked at the role of teacher as explainer. The teachers in his study were given magazine

articles about a specific topic and instructed to prepare and present a lecture on that material to a group of high school social studies students. The first day, teachers lectured on Yugoslavia based on an article from Atlantic Monthly; on the second day teachers lectured on Thailand. The third lecture was a tape on Israel, prepared by Rosenshine. These lectures were analyzed using a variety of variables, including the use of linking words or "explaining links." Instances of these explaining links were such words as "because," "therefore," "if . . . then," "in order to," and "consequently." The presence of these links correlated positively with student achievement. His later review of what is called explicit teaching (Rosenshine, 1986) is an amalgam of both direct and indirect instruction. According to Rosenshine, explicit instruction, including both teacher talk and student talk, established a climate more applicable to the teaching of the descriptive knowledge typical of textbooks. By contrast, indirect teaching generated a climate more suitable for problem solving activities (see Gagne, 1970). If Rosenshine is correct, teachers must make decisions concerning the nature of their tasks and ascertain patterns of linguistic behavior appropriate for their planned activities.

Climatic process-product research produced three key findings: that it was possible to collect reliable data on the behavior of teachers in classroom sites and situations, that one could correlate operationalized variables with

student measures, and that teacher decision-making processes might be of primary importance in instruction.

The second school of applicable research was of the linguistic genre. Bellack et al.(1966) analyzed the relationship of teacher moves and student achievement in senior high school economics classrooms and identified the specialized functions of teachers and students as shown through actual linguistic behaviors, not attitudes or expectations. Four major categories of actions were suggested: structuring (setting the context for subsequent behavior), soliciting (eliciting a verbal response), responding (reciprocating the solicitation), and reacting (modifying previous behavior). Bellack noted that classes judged significantly lower on performance deviated from the means with respect to structuring behavior. When applied in moderation, this function had a positive effect on student achievement. When applied excessively in either direction, the result was negative. Implicit in the findings was the role of teacher judgment in determining which move to apply at any particular time within the lesson.

Whereas Bellack was interested in the practical use of language in the classroom, Smith and Meux (1970) were interested in the logical operations involved in using the same language. By logical operation, they meant "the forms which verbal behavior takes as the teacher shapes the subject matter in the course of instruction" (p. 3). They grouped discourse into the following categories: (a) defining, (b)

describing, (c) designating, (d) stating, (e) reporting, (f) substituting, (g) evaluating, (h) opining, (i) classifying, (j) comparing and contrasting, (k) conditional inferring, (l) explaining, and (m) directing and managing classroom. For purposes of this study, their work in the areas of conditional inferring and explaining is most germane. Through an investigation of classes in social studies, mathematics, English, and science, Smith and Meux showed that differences exist in the use of these categories between both subject areas and teachers within each area. For example, science and mathematics teachers emphasized explanations, whereas social studies and English teachers did not.

Gregory (1972) determined that students in seventh grade mathematics classes exhibited more growth in conditional reasoning ability while in classes where the teacher exhibited a higher frequency of such usage. Through application of the Cornell Conditional Reasoning Test as both a pretest and posttest to these students, he determined that those who studied with teachers who used a high frequency of conditional moves grew more in logical reasoning ability than those who studied with a teacher who employed a low frequency of conditional moves. Gregory and Casteel (1975) verified these findings with a population of eighth grade math students. Using a sample of eighth grade social studies students, they found a negative correlation. Mathematics teachers used the ability to control verbal actions to emphasize mathematics. Social studies teachers neglected

history and emphasized opinion. Using the Social Studies Observation Record (SSOR) (Casteel & Stahl, 1973), Casteel analyzed the transcripts of the lessons that Gregory studied and found that teacher utilization of contextual solicitations accounted for 89% of the variance in teacher utilization of conditional moves. Working in microteaching and field settings, Gregory and Casteel (1975) found that frequency of conditional reasoning in the language of students directly related to the frequency of such reasoning in the verbal behavior of the teacher.

These findings led to the creation of the Technical Skills Observation Schedule (TSOS) by Casteel and Gregory (1979). Through this instrument, the verbal behaviors of the classroom teacher were categorized as to both functional and dysfunctional nature. Where most previous studies (e.g., Rowe, 1973) concentrated on the results of a single move, Casteel and Gregory suggested that it was the interaction of multiple moves that was most effective, a pattern of functions used within instructional contexts.

These functional behaviors or moves were categorized as structuring (introducing, teaching, and closing a lesson), conditional (logical premises are explicitly established in terms of which a conclusion is to be deduced), wait time (3-5 second intervals of silence preceding or during a response), probing (soliciting additional information), and reacting (multiple reinforcement). The dysfunctional moves were obstructive (multiple solicitation, confusion, and internal

and external disruption) and inhibiting (interruption, criticism, and ridicule).

In the years since this research was conducted, both schools of thought have received attention. The climate research can be seen in the work of Anderson (1981) and others on the attitudes of elementary students. Wittrock (1986) discussed the self-fulfilling prophecy, that high or low teacher expectations regarding student achievement lead to a corresponding level of student self-perception of ability, and subsequently to achievement.

Process-product continues to be a major line of educational research. In their review of this research paradigm, Brophy and Good (1986) cited approximately 200 varying articles that consistently concerned teacher effects on students rather than teacher effectiveness. Teacher effectiveness research equates effectiveness with success; the research on teacher effects explores both positive and negative results of specific teacher behaviors. The more recent process-product studies, according to Brophy and Good, have led to a realization that the complexity of instructional problems, both the process and the product, can not be overcome with a simple prescription.

Cognitively Oriented Work

Four lines of investigation explore how teachers process and use information: teacher judgment (Doyle, 1977, 1978a,

1978b), teacher thinking (Clark & Peterson, 1986), teacher content knowledge (Shulman, 1987), and teacher expertise (Berliner, 1979).

According to Doyle (1978b), teacher judgment is context specific and structurally dependent, and he offers three paradigms that serve to frame the conceptualization of how teaching works: process-product, the mediating process, and classroom ecology (Doyle, 1978b). The process-product paradigm defines legitimate inquiry in terms of relations between teacher behavior and student learning outcomes. This approach is based on a two-factor criterion-of-effectiveness structure that relates teacher variables directly to effectiveness indicators. The structure of the paradigm is a prediction formula: define the criterion and find its predictors. The paradigm has the advantages of simplicity and generality. The results of process-product inquiry are expected to have direct practical application as sources of content for teacher education and as tools individual practitioners can apply to improve instruction.

The mediating process paradigm, represented mainly in research on prose learning, focuses on the tacit human processes that serve to mediate instructional stimuli and learning outcomes. This process can be seen as a recasting of the process-product paradigm through the addition of information-processing responses made by the students during exposure to instructional stimuli. Teacher behaviors and instructional materials, rather than causing student

learning, serve only to influence it. This paradigm redefines the nature of the relationship between instructional stimuli and student response variables. Students do not simply stand between process and product variables. Rather, their responses play an active mediational role in determining what is processed and in what method.

The ecological paradigm focuses on the relationship between environmental demands and human responses in natural classroom settings. It integrates and interprets the descriptive material from naturalistic studies of classrooms. Student strategies fostered by classroom environments are analyzed, depicting an expansion of the mediating process paradigm placing student response variables within the context of school learning conditions. These conditions include such variables as class size, equipment and materials available, and information load. The process identifies environmental demands and speculates about the mediational strategies necessary to meet these demands successfully.

Doyle (1977, 1978a, 1980) saw the classroom as possessing the ecological characteristics of multidimensionality, simultaneity, immediacy, history, publicness, and unpredictability. The effectiveness of any given group of teachers is a function of their ability to transform the complexity of the environment surrounding them into a conceptual system that enables them to interpret discrete events and anticipate the direction and flow of

classroom activities. Teachers' judgments and decision-making abilities once again become paramount.

Clark and Peterson (1986) explored teachers' thought processes, tracing research back to Jackson (1968) and the first studies to describe the mental constructs underlying teacher behavior. Clark and Peterson developed a heuristic device that isolated the domains of teacher thinking into thought processes and actions and described the interplay between these domains as a representation of what is occurring inside the mind of a teacher. Most of their focus was on planning as a prime component of teacher thought.

Calderhead (1987) referred to the metaphor of teaching as a "reflective, thinking activity" (p. 1). He drew on the work of Schon (1983) and his reference to knowledge that is embedded in the skilled action of a professional, shifting attention to the teacher as a skilled professional representative of the appropriate academic disciplines and traditions.

The third line of investigation is that of content knowledge. Shulman (1986b, 1987) explored the role of teachers' cognitive understanding of subject matter content and the relationship between such understanding and the instruction teachers provide students. Shulman distinguished three kinds of content knowledge--subject matter knowledge, pedagogical knowledge, and curricular knowledge. Subject matter, or content knowledge is the amount and organization of knowledge in the mind of the teacher; pedagogical

knowledge is knowledge about the teaching act and the ability to transform and represent content to the students; curricular knowledge is the ability to evaluate and select between the myriad of available materials within a particular field. Shulman (1986b) also defined three forms that each of these categories of knowledge might take: propositional (principles, maxims, norms), case (specific, well documented examples), and strategic (problem solving). The knowledge of the teacher is based on various combinations of these categories and forms of knowledge. Shulman (1986a) called for research to articulate and build a body of literature to incorporate these forms and categories into teacher education.

Beyond process-product, climate studies, and subject matter knowledge, there exists a body of research derived from studies on what constitutes an expert in various fields. From de Groot (1978) on chess through Chi, Glaser, and Farr (1988) on the professions, a theoretical base for expertise is being developed. To this date, those who have studied expert versus novice behavior have relied on methodologies such as thinking aloud and stimulated recall to uncover the thought processes of the expert.

Collins, Brown, and Newman (1989) tied together the concepts of expertise and apprenticeship and called for the development of a new cognitive apprenticeship to intensify the thinking and problem-solving skills involved in a particular subject. In order to make real differences in

skill acquisition, they felt the need to understand the nature of expert practice and to devise methods appropriate to learning that practice. Through reflection on the processes of expert performance, an apprenticeship would be developed emphasizing the uses of both conceptual and factual knowledge situated in the context of its use. This process encourages reflection on differences between novice and expert performance by alternation between expert and novice efforts.

Studies of what constitutes an "expert" in the teaching profession have emphasized the protocol of presenting teachers with problems or situations in clinical settings and asking them to interpret these situations. This act of interpretation has included both understanding of and appreciation for the situation. Expertise is determined by the conceptual depth of understanding and the critical nature of the suggested solutions. To date, these studies have proved useful in formulating hypotheses and beginning to sketch an image of what an expert teacher might "look like" in contrast to an experienced or novice teacher. The expert teacher is therefore seen as an "ideal type" concept, one that is a probability rather than an operational construct. There are identifiable attributes of an expert, but no one person is likely to possess them all. The application of such concepts then becomes an action of matching particular examples to the list of attributes and determining the probability that there is a fit.

Although provocative, these clinical studies lack what Neisser (1976) calls ecological validity. According to Neisser, a theory can change the beliefs of a whole society if that theory has

> something to say about what people do in real, culturally significant situations. What it says must not be trivial, and it must make some kind of sense to the participants in these situations themselves. If the theory lacks these qualities--if it does not have what is nowadays called "ecological validity"--it will be abandoned sooner or later.(p. 2)

Through the use of field site interviews, the question of ecological validity will be addressed in this study. In a similar vein, Kennedy (1991) referred to the fact that teachers develop a set of concepts and expectations about teaching--not all good or valid--based on years of prior experience. They must be provoked to question these experiences and the accompanying beliefs. This process of conceptual change is based on the work of Posner, Strike, Hewson, and Gertzog (1982), who proposed that deviating examples must be accompanied by some analytic commentary or challenging questions to dislodge dissonance.

There is general agreement among teacher educators that a significant quality of effective teachers is their ability to plan. Planning is seen as a complex concept (May, 1986). To plan is a mental process where one systematically organizes content, materials, and activity structures appropriate for a group of students, likely to eventuate in learning and growth. As defined by the Florida Performance Measurement System, planning is the "preclassroom teacher

activities that develop schema for classroom activities" (Florida State Department of Education, 1983, p. 5). Planning also must take into consideration such factors as time frames and instructional periods. For this reason it must be a process of accommodation (Clark & Yinger, 1977).

Looking at classic social studies methods books, one finds mention of planning as a critical dimension of teaching (Horn, 1937; Hunt & Metcalf, 1968; Johnson, 1915; Michaelis, 1950; Wesley, 1937; Wesley & Wronski, 1958). In addition, a survey of textbooks written more recently for use in elementary and/or secondary social studies methods courses reveals that none are without a chapter on the topic of planning (Banks, 1990; Bruner, 1986; Ellis, Fouts, & Glenn, 1991; Mahood, Biemer, & Lowe, 1991; Martorella, 1985, 1991; Maxim, 1991). For these authors, planning reflects the mental capacity of the teacher. As Martorella (1985) stated in his methods book,

> experienced teachers often make effective teaching look effortless or spontaneous to an untrained observer. Such teachers even may profess to have done no immediate or sustained planning for their lessons. In reality, through trial and error over the years, seasoned social studies teachers gradually build on their series of successful planning experiences. (p. 88)

Studies of expertise have now led to the conclusion that it takes five or more years to master the complexities of classroom teaching (Huberman, 1985). As opposed to what Martorella is saying, the process is more than trial and error for a set of criteria are in place (Berliner, 1986). If planning influences classroom performance and five or more

years are required to gain expertise in this field, then differences must be in evidence between novice and expert teachers in the way in which they think about what it is they are doing (Richardson, 1990).

Three variables will be used in this study to explore the nature of teacher expertise. One would expect the experts to talk about their planning and the planning process with more fluency, with more deliberation and less impulsivity, and with more awareness of situational variables, employing more examples of conditional logic. These variables will be operationalized as ideational fluency (Houtz & Coll, 1979; Rosenshine, 1969); wait time (Casteel & Gregory, 1979; Rowe, 1986, 1987; Tobin, 1987); and conditional inferring (Casteel & Gregory, 1979; Smith & Meux, 1970).

Procedure

The purpose of this study was to investigate the manner in which 38 secondary social studies teachers verbalized their planning processes. Ten of these teachers were identified as novices, having graduated from the PROTEACH program at the University of Florida within the previous five years. Nine were identified as novices, having obtained teacher certification in Florida through the more conventional methods of a four year program or taking the required courses outside a program. All had either a bachelor's or master's degree. A third group of teachers were

identified through the use of expert panels consisting of a district level administrator from the appropriate county and university personnel involved in the teacher education program. Secondary social studies teachers with at least five years experience were evaluated by the panel using the Expert Teacher Evaluation Instrument (Appendix B). Through scores on this evaluation, 10 were identified as experts. The same panels identified a fourth group of nine teachers who were considered non-experts.

A structured interview was conducted with each teacher. The interview questions were derived from the Planning Questionnaire of the Florida Performance Measurement System. Transcripts of the interviews were coded using a combination of techniques to identify instances of fluency, wait time, and conditional logic.

The following questions were posed:

1. Are there any differences among the various groups with regard to the fluency of the speaker?

2. Are there any differences among the various groups with regard to the use of wait time?

3. Are there any differences among the various groups with regard to their use of conditional logic?

Hypotheses

The following hypotheses were tested:

1. There is no difference between members of any two subpopulations with regard to fluency.

2. There is no difference between members of any two subpopulations with regard to the use of wait time.

3. There is no difference between members of any two subpopulations with regard to the use of conditional logic.

4. The score on wait time is not affected by the score on fluency.

5. The score on wait time is not affected by the score on conditional logic.

Definition of Terms

An Expert teacher is one who has at least five years of experience and is perceived by a panel consisting of the district level supervisor of social studies education, a university faculty member in social studies education, and the investigator as meeting the criteria listed on the Expert Teacher Evaluation Instrument (Appendix B).

A Non-expert teacher is one who has at least five years of experience in the teaching field but is not perceived to be an expert teacher (see definition above).

A Novice teacher (nontraditional) is one who has fewer than five years experience in the teaching field and graduated from a fifth year social studies education program.

A Novice teacher (traditional) is one who has fewer than five years experience in the teaching field and holds either a degree from any traditional four year teacher education program in social studies or has taken the necessary courses to obtain certification in secondary social studies in Florida.

Fluency is the ability to verbalize thought processes fully, as measured by the number of relevant ideas in responses.

Wait time is the reflection time taken before a response is given as indicated by the amount of time between the end of the question and the beginning of a response as well as silences between thought units within a response.

Conditional logic is providing explicit, logical premises in terms of which a conclusion is to be deduced, as measured by the presence of specific words or phrases in the response.

Planning is visualization of the future, reflection on past experiences, inventory of the means and ends, and construction of a framework for future action, as shown in the preoperational preparation and postoperational reflection of classroom teachers.

Assumptions

1. The Expert Teacher Evaluation Instrument as administered by the panel will yield a sample of those teachers perceived to be experts.

2. Responses of the subjects at the end of the school year are consistent with their responses throughout the year.

Limitations

1. The sample of convenience in which all teachers were from North Central Florida may have resulted in an atypical teacher population.

2. The academic and workplace backgrounds of the novice population varied.

3. The novice (nontraditional) sample were all graduates of the PROTEACH program at the University of Florida, the majority of whom have an undergraduate GPA of at least 3.0 and a GRE score of at least 1000.

4. The novice (traditional) sample were graduates of various programs. Their undergraduate GPAs and GRE scores varied.

Delimitations

1. The study is limited to secondary social studies teachers in North Central Florida.

2. The novice teachers (nontraditional) were all graduates of the secondary social studies PROTEACH program at the University of Florida.

3. Differences in the variables of fluency, wait time, and conditional logic were the only ones studied.

CHAPTER 2
LITERATURE REVIEW

This chapter reviews literature in the various dimensions of the study. In section one, teacher preparation programs are discussed. In section two, the aspects of teacher thinking and planning are reported. In section three, the nature of expertise is analyzed. In section four, the identification of experts and novices is explored. In section five, the variables of teacher discourse are discussed.

Preservice Teacher Preparation Programs

Over the last decade, teacher preparation has become a national issue. Floden and Klinzing (1990) discussed the interplay between the research on teacher thinking and teacher preparation and called for slow, steady implementation of new ideas into the system. They were joined by Lampert and Clark (1990) in a further call for additional research on expertise and how it is communicated from educator to student. Others writing on this topic included Goodlad (1990b) who called for the upgrading of all teacher education programs to the level of other professional academic and clinical education programs, a call echoed by

Howey and Zimpher (1986), Nelson (1990), Scannell (1984), Wallace (1986), and Zeichner and Liston (1990).

Several national reports were issued on the state of the teaching profession. In 1986, Tomorrow's Teachers, by the Holmes Group and A Nation Prepared, by the Task Force on Teaching as a Profession of the Carnegie Forum, both addressed the issue of the need to facilitate the emergence of teaching as a true profession and the improvement of the education available to our school children. In so doing, both dealt with the preservice training that teachers receive in our colleges and universities. Both called for the dissolution of the undergraduate education major in favor of a form of extended graduate level programs either five year or fifth year (Soder, 1986; Wiggins, 1986).

An important question is whether the extended program is the appropriate response to the current situation (Lanier and Featherstone, 1988). None of the authors cited disagreed about the scope of the problem, but on its solution. Funkhouser (1988) proposed a strong academic rationale for making such a change. Similar reasoning was used by Smith, Carroll, and Fry (1984) in explaining the changes made at the University of Florida and Berliner (1984) in cautioning that the role of education coursework not be downplayed in the haste to reform the system.

Ashton and Crocker (1987) cautioned that no one model can answer all the questions and address all the needs of schools. They called for what is known as "systematic study

of planned variation" (p. 2)--the amalgamation of various ideas to find what are the effective elements of a revised program. This program might be four or five years.

Corbin (1985) and Hawley (1987) questioned whether universities and colleges are the appropriate place for teacher education at all. They both called for a complete restructuring of teacher preparation through the use of cooperative institutes or teacher preparation centers where the school systems and universities would jointly work with apprentice teachers. The problems with the current university system would be addressed through major revisions in the undergraduate curriculum.

Another area of concern was the requirement of the master's degree for teaching. Turner (1990) and Knapp, McNergney, Herbert, and York (1990) agreed that the relationship between the amount of graduate study and teacher effectiveness was weak. Knapp did not find this persuasive enough to override the additional cost of the degree. Turner considered it as further evidence that the time is coming when the degree will be mandated, remarking that it would be necessary to maintain the position that teachers should be better educated than the general population.

The response of the education community to these reform issues has varied. Students would still pursue the profession in either four or five year programs (Cyphert & Ryan, 1984). Current teachers and administrators are in favor of the status quo (Tracy, Sheehan, & McArdle, 1988). The data used

by both researchers were based on small, poorly constructed samples with low response rates (less than 36%). In the case of the Tracy study, in particular, 73% of those being surveyed were experienced teachers--persons with a vested interest in maintaining the current system.

Few empirical studies have been conducted on the effectiveness of either type program. Although there are problems with the current system, it has not been shown that the extended program alleviates those problems. Recent data have been compiled at the University of New Hampshire (Andrew, 1990), where both four and five year programs have been in place concurrently for the past 15 years. Findings indicate that five year programs produce teachers who are more likely to stay in the profession and have a stronger sense of self-worth than their four year counterparts. Casteel and Banks (1990) found similar results at the University of Florida. Neither study, however, was constructed to address the relative effectiveness of the programs. It is probable that neither the length nor the site of the teacher education program is the key to success. The missing variable may well be the content of the program and the ability of the teacher to translate that content into practice in the classroom.

One example of an innovative programs is PROTEACH, the teacher education program at the University of Florida. PROTEACH began in 1984 as a result of faculty and administration concern over the level of content and

pedagogical knowledge necessary to be a professional teacher and the inability of the traditional four year program to properly address these concerns (Smith, et al., 1984).

It is possible in the state of Florida, as in other states, for those persons possessing a bachelor's degree from a program that is not in teacher education to obtain teacher certification. This is done through the "course count" method, wherein the person takes the specific professional preparation coursework specified as minimal by state law (see Appendix F). In Florida, the requirements are as follows:

1. Six semester hours in sociological and psychological foundations of education;

2. Six semester hours in general methods of teaching, administration, and curriculum;

3. Two semester hours in special methods of teaching the specific content area; and

4. Six semester hours of student teaching or two years of full time experience (Florida State Board of Education, 1989).

PROTEACH sought to do more than provide the minimal postbaccalaureate coursework. As stated by Casteel (1990),

> the purpose of secondary PROTEACH is to educate and graduate knowledgeable, skilled, and professional teachers who, over time, will master the art and science of their vocation. The expectation is that PROTEACHers will be more knowledgeable, more skilled, and more professional as beginning teachers than are the graduates of traditional teacher education programs. (p. 1)

According to the Institutional Report (University of Florida, 1990) submitted to the National Council for Accreditation of Teacher Education (NCATE), the program was designed "to produce teachers who possess a sound background in the content and processes of their fields and who can effectively communicate that knowledge to their students" (p. 27).

Within PROTEACH, the various content area specializations have designed their own specific courses of study. Adler (1991) called for a multidimensional course of study for preservice teachers that recognizes the complexities of becoming a teacher--the multiple tasks, the diverse individuals involved as teachers and learners, the multiple contexts for learning and practice.

The social studies PROTEACH program is an example of such a design in that it includes several integrated semester-long courses within which the students are given the opportunity to acquire and practice pedagogical skill in a variety of areas. The PROTEACH program is based on the idea that each area of study is interrelated with and dependent upon the others--none functions on its own. The professional teacher draws upon all his or her skills simultaneously within the decision-making process (University of Florida, 1990).

The areas of study include three realms of teacher behavior: offstage, onstage, and reflection. Offstage behavior includes invention (representing the tacit as well

as explicit disciplines), design (transforming knowledge of the discipline into instructional tasks), and planning (organizing materials and pacing significant topics). Onstage behaviors are academic management (establishing and maintaining an academic workplace), academic instruction (establishing and maintaining academic discourse), and academic affiliation (establishing and maintaining a positive learning climate). Reflection consists of professional collection (generating and organizing data about performance), professional celebration (articulating and refining a vision of professionalism), and personal criticism (describing and interpreting performance in order to derive professional prescriptions) (Casteel, 1992). Through a concentration on the linguistic dimensions of teaching, social studies PROTEACHers are prepared to address each of the nine areas.

Teacher Thinking

The most extensive reviews of literature on the subject of teacher thinking and its relationship to planning were conducted by Clark (1988), Clark and Yinger (1977, 1987), Clark and Peterson (1986), and Clark and Dunn (1991). They connected teacher behavior with the thought processes of the teacher. The thinking, planning, and decision making of teachers were seen as a large part of the context within which teaching and learning occur. They identified two major

assumptions of the researchers in this field: first, that it is possible to describe fully the mental lives of teachers, and second, that behaviorally observable activities of teachers take on forms and functions based on some identifiable processes. As Clark and Yinger (1987) put it, "They ask when and why teaching is difficult, and how human beings manage the complexity of classroom teaching" (p. 84-85).

Jackson (1968) conducted one of the earliest empirical studies of the mental constructs and processes underlying teacher behavior. His descriptive study went against the prevailing teacher effectiveness paradigm, by portraying the full complexity of the teacher's task, by making distinctions that fit the teacher's frame of reference, and by calling educators' attention to the importance of describing the thinking and planning process of teachers to better understand the totality of classroom processes.

According to Clark and Peterson (1986), an agenda for research on teaching was set by the National Institute of Education during a 1974 meeting. Panel 6, Teaching as Clinical Information Processing, called for research into the psychological processes by which teachers perceive and define their professional responsibilities and situations. They saw the teacher as clinician, a clinical practitioner who had more in common with physicians, lawyers, and architects than with skilled technicians. This view of the teacher had a profound impact on the questions asked, methods of inquiry

used, and the form of the results reported in subsequent research on teacher thinking.

Clark and Peterson (1986) developed a model to depict the two domains of teaching--teacher thought processes and teacher actions plus their effects. The former domain occurs "inside teachers' heads," whereas the latter is observable. Being observable and therefore more easily measured, the domain of teacher action saw the majority of research. Process-product researchers have been concerned with the relationship between specific observable teacher actions and student classroom behavior and achievement.

The domain of teacher thought included planning (both preactive and postactive thought), teachers' interactive thoughts and decisions, and teachers' theories and beliefs. The first two are temporal, deriving in part from Jackson's (1968) distinction between preactive, interactive, and postactive phases of teaching.

The type of thinking done by teachers in the presence of students (interactive) is perceived as qualitatively different from that done in the absence of students. Clark and Peterson (1986) combined preactive and postactive thought under the rubric of planning because the "teaching process is a cyclical one the distinction between preactive and postactive thoughts has become blurred" (p. 258). The model flows in both directions as thought processes lead to actions and actions in turn lead to further thought processes.

In investigating the planning process, researchers looked at all grades and subject areas. Clark and Peterson (1986) reviewed over 20 studies in the area, the majority of which were descriptive. They revealed the complexity of the process and reinforced its use by all teachers.

Clark and Peterson described planning as providing "a direct view of the cognitive activities of teachers as professionals," (p. 267) and noted as many as eight different types of planning that teachers engaged in during the year, nested within and interacting between one another. Planning was a transformational activity wherein the curriculum (as published) was adapted through additions, deletions, changes in sequencing, interpretations and misunderstandings. Other functions of planning included instructional time allocations for subject matter and for individuals and groups of students, study and review of the content of instruction by teachers, organization of daily, weekly, and term schedules, meeting administrative accountability requirements, and communicating with substitute teachers. Planning also had certain immediate psychic rewards for the teacher in the form of feelings of confidence and reduction of uncertainty.

Yinger (1987, 1990) described the thoughtful professional as engaged in a close relationship or conversation with their place or audience, a conversation culturally grounded in a rich tradition of practice. Teaching was grounded in specialized practice in generalized and somewhat isolated institutions. By conversation, Yinger

referred to "the means by which social practices are conducted. Language as utterance or text frames social interaction, and evidence suggesting that a practitioner's interaction with materials and places is framed by a 'language of practice' as well" (p. 81).

John Dewey (1933) was among the first to refer to reflection as a synonym for thinking. Reflection for Dewey, involved "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends" (p.9). Donald Schon (1983) described the intermingling of thought and action as thought in action, using the term "reflection-in-action." Schon's research findings were confirmed by those of Sparks-Langer and Colton (1991) as well as Sparks-Langer, Simmons, Pasch, Colton, and Starko (1990) who placed reflection in perspective within the framework of teaching.

The thinking of teachers can be represented in their language. Most discourse analysis researchers have investigated interchanges within the classroom (Lindsay, 1990). Grimshaw (1989), however, based his research on the assumption that naturally occurring conversational discourse is a source of sociological data. Munby (1989) saw the problem with this representation as the fact that a teacher's actions may derive from impressions of events as well as from statements of events. Teachers interpret what occurs and then respond to that interpretation. Munby studied a teachers' use

of metaphor in the language they employ when talking about their work. Through these metaphors he was able to construct the teachers' professional reality.

These metaphors are not necessarily overt. They are often only uncovered through indepth discussion. For example, in the case of his subject, Alice, Munby took fragments of speech such as "Keep it somehow moving smoothly,""We were slow at getting started today,""It went real well," and "When I keep it going" to all suggest travel or movement. From that he derived a base metaphor for Alice of "the lesson as a moving object." The figure seemed so salient that it was construed as representing a significant feature of how Alice constructed her world of teaching. Munby never claimed that Alice was aware of her use of the metaphor, but only that it was a valuable tool with which to understand her own unconscious understanding of reality.

Jackson (1968) found a similar problem with the verbalization of teacher thought processes when he noted the absence of a technical vocabulary for teacher talk. He noticed teachers as relying on an unnecessary simplicity that belied the true nature of the profession. He identified four aspects of conceptual simplicity in teacher language,

> 1. an uncomplicated view of causality;
> 2. an intuitive, rather than rational approach to classroom events;
> 3. an opinionated, as opposed to an openminded, stance when confronted with alternative teaching practices; and
> 4. a narrowness in the working definitions assigned to abstract terms.(p. 144)

The result of this lack of professional vocabulary presented a rather unflattering picture of educators as people who skimmed the intellectual surface of the problems they encountered. Yet the teachers in Jackson's study were considered to be highly respected practitioners of the teaching craft, experts in their field. The exact definition of this expertise is left unstated, however.

Nature of Expertise

Recent research on the nature of expertise can be traced to the work of de Groot (1966), who studied chess experts and found that they had certain characteristics such as memory of chessboards and being able to store up to 50,000 images of chessboards in their minds that they could call upon in the appropriate situation. This memory was defined in terms of extensive experience as well as a language for describing and reflecting upon that experience. Knowledge was also found to be organized such that it was easily retrievable (Chase & Simon, 1973).

Chi, Glaser, and Farr (1988) expanded that research into the fields of bridge players, physics, and baseball and found seven characteristics of experts that are robust and generalizable across the various domains:

1. Experts excel mainly in their own domains. There is little evidence that skill in one domain is transferable to another.

2. Experts perceive large meaningful patterns in their domain, chunking data for retrieval. This is not reflective of a superior perceptual ability, merely an ability to organize the knowledge base.

3. Experts are faster than novices at performing the skills of their domain, solving problems quickly with little error. Though studies find experts slower than novices in the initial phases of problem solving, experts solve problems faster overall. This comes from extensive practice at the task involved, or the organizational ability referred to previously.

4. Experts have superior short-term and long-term memory. This is not because their short-term memory is larger than that of other humans, but because the automatic nature of much of their skill frees up resources for greater storage.

5. Experts see and represent a problem in their domain at a deeper, more principle driven, level than novices; who tend to represent a problem on a more superficial level. Although both experts and novices have conceptual categories, the experts' categories are semantically or principle based, whereas the categories of the novices are syntactically or surface feature oriented.

6. Experts spend a great deal of time analyzing a problem qualitatively, trying to understand the problem fully before solving. Novices plunge immediately applying

solutions. Once experts have identified their choice of solution, the overall time of problem solving is shorter.

7. Experts have strong selfmonitoring skills. Whether in chess or physics, experts are able to tell better when they are in error or need to recheck their solutions. This is reflective of their greater domain knowledge as well as a different representation of that knowledge.

Research in the area of what constitutes an expert in the teaching profession has been led by the work of Berliner and his associates at the University of Arizona (Berliner, 1986, 1988; Brandt, 1986). They reviewed the studies of numerous researchers into the differences between expert and novice teachers in a variety of settings. As Glaser (1987) put it

> increased understanding of the nature of expertise challenges us to inquire how it is learned. It seems evident that expertise is acquired when people continually try to confront new situations in terms of what they know. Increasing ability to solve problems and generate new information is fostered by available knowledge that can be modified and restructured. This knowledge, when interrogated, insatiated, or falsified by novices in the course of learning and experience leads to organizations of knowledge that are the basis for the more complete schemata of experts. When teaching beginners, this might be accomplished by assessing and using relevant prior knowledge, or by providing obvious organizational schemes or temporary models as scaffolds for new information. These temporary "pedagogical theories" are regularly devised by ingenious instructors and could be incorporated more systematically into instruction. In addition, instruction should focus on the development of procedurally oriented knowledge structures that incorporate knowledge with the conditions of its use and applicability. (p. 92)

Leinhardt and Greeno (1986) analyzed the lesson plans, activity structures, and routines within classroom activities of elementary mathematics teachers. They discovered that expert teachers provided clear, concise reviews; conducted administrative work quickly; and established clear classroom routines. In contrast, novices experienced more difficulty with regard to balancing these diverse but often simultaneous tasks.

Borko and Livingston (1989) studied the planning, teaching, and postlesson reflections of three student mathematics teachers and their cooperating teachers. They observed student teachers teaching mathematics for one week of instruction and interviewed them before and after the lesson. Novices showed more time-consuming, less efficient planning, encountered problems when their attempts to be responsive to students led them away from scripted lesson plans, and reported more varied, less selective postlesson reflections than their cooperating teachers.

The researchers accounted for these differences by the relative simplicity and disconnectedness of the novices' cognitive schemata. The knowledge system of the expert was more structured and provided a framework for determining what information was relevant to their planning and interactive decisions and what could be ignored. By comparing information from the environment with relevant cognitive schemata, an expert could quickly determine whether specific information was useful in the decision-making process. Novices, in

contrast, found it necessary to elaborate their schemata while continuing to teach and were less able to discern the relevance of information.

Housner and Griffey (1985) found that, when planning, experienced physical education teachers made more decisions concerning strategies for implementing instructional activities than did inexperienced teachers. During interactive teaching, experienced teachers focused on individual student performance, whereas inexperienced teachers attended most to the interest level of the entire class. The researchers posited that experienced teachers possess knowledge structures rich in strategies for managing students and facilitating psychomotor performance that enabled them to attend to individual student performance and alter lessons as necessary in response to student needs. Inexperienced teachers possessed fewer strategies and focused attention on the interest level of the entire group.

Identification of Experts and Novices

Defining and identifying experts and novices is a key concern in the study of expertise. An expert chess player, for example, can be identified simply by noting the record of wins over tough opponents. In the sports arena, the decision of trained judges is taken into consideration. In teaching, objective criteria are less clear.

Berliner (1986) bemoaned the lack of external and independent criteria for determining expert status. He investigated the nominating process for teacher of the year and found it subjective and inconsistent. Whereas judging livestock, crops, dogs, and athletes takes years of practice and training, teacher of the year candidates were judged by untrained, inexperienced judges from other professions. Berliner's solution was to establish criteria based on the domains of knowledge used by expert teachers in accomplishing their tasks, with subject matter knowledge and knowledge of organization and management of classrooms as the two areas deemed necessary to identification of expertise.

As in the work of de Groot (1966), the presence of multiple schemata for the organization and dissemination of information should be an important part of expertise. Peterson and Comeaux (1987) investigated the differences between novice and experienced teachers in their recall and analyses of teaching problems. Experienced teachers recalled more classroom events and relied more on procedural knowledge and principles in analyzing classroom events, possible evidence that experienced teachers have better developed knowledge structures or schemata for classroom teaching than do novice teachers. This interpretation is consistent with that of Clark and Peterson (1986), who argued that experienced teachers have better developed knowledge structures for phenomena related to classroom teaching and learning. Doyle (1977) also emphasized the importance of a

conceptual system for transforming the complexities of the environment.

Strahan (1989) used a technique known as "semantic ordered trees," wherein teachers were asked to select key terms and diagram relationships among them. Experts selected more terms, organized them into more precise groupings, and created more coherent relationships. When interviewed, experts viewed teaching as more student-centered, whereas the novices were more teacher-oriented.

Martorella (1985), however, claimed that teachers develop their planning schemata through trial and error. If all teachers improve through this process, then given sufficient time all teachers will become expert.

Clearly, expert teachers possess a knowledge about classrooms different from that of novices. When provided with information about students prior to teaching them, experts paid little attention to this information, preferring to establish their own relationships with the students. Novices, on the other hand, wanted as much information as possible. They made judgments, however stereotypical, before ever meeting the students. Expert teachers also possess a richer set of schemata with which to interpret classroom phenomena and react in a timely way to complex situations. In contrast, novices are limited in the scope and depth of their cognitive schemata and are slower and less prepared to react to changes in classroom situations (Carter, Sabers, Cushing, Pinnegar, & Berliner, 1987).

Similar results have been found when using a "look again task" where teachers are shown slides of classroom situations and asked to comment. Experts weigh the importance of each piece of visual information and represent management and instructional situations into meaningful problem units through the use of a highly developed set of schemata. Novices view situations more literally. Their view of the picture was constricted by a much more limited set of schemata, and this constriction allows extraneous information to impose on their decision-making capacity (Carter, Cushing, Sabers, Stein, & Berliner, 1988).

Leinhardt and Greeno (1986) discovered that experts possess greater selfregulatory and metacognitive capabilities such as skill in planning, sensible use of time, and dealing with uncertainty as a fact in teaching. They also found that teachers do not write down their plans, but have them firmly embedded in their minds. Experts are also better able to integrate new information with prior knowledge, being aware of the variety of behavioral cues from students. They possess a comprehensive view of the classroom (Westerman, 1990) and they are better able to improvise, modify existing plans, and use different rhythms as necessary (Tochon, 1990).

Leinhardt (1988) placed this holistic composite of the expert teacher within the realm of situated knowledge, which he defined as "a form of expertise in which declarative knowledge is highly proceduralized and automatic and in which a highly efficient collection of heuristics exist for the

solution of very specific problems of teaching" (p. 146). This automation or resistance to change on the part of the teacher is not an example of stubborn ignorance or authoritarian rigidity, but rather the response of an expert to the consistency of the total situation with a desire to continue acting like an expert. In contrast, novices have problems with the transfer of teaching behaviors from their coursework to the teaching situation because of a lack of perceived consistency.

Though no single definition of expertise has been agreed upon, a number of characteristics have been identified. Throughout the research on levels of teacher expertise, there is a reliance on the ability of the subject teacher to competently describe the actions taking place. This discourse is both multifaceted and measurable in a variety of ways.

Teacher Discourse

Ideational Fluency

According to Guilford's (1959) model of the structure of the intellect, individuals possess 120 mental abilities, including some he labelled divergent. The differentiating characteristic of divergent abilities is that a variety of responses are produced to a given stimulus. The semantic

variation on this ability is referred as ideational fluency. As defined by Wallach (1970)

> ideational fluency refers to the ability to generate--within a limited time--ideas that will fulfill particular requirements, such as naming uses for bricks, naming problems that are suggested by certain common situations, writing titles for a story plot, or naming the consequences that might be entailed by certain changes. (p. 1213-1214)

While conducting research in the area of religious education, Torrance (1963) demonstrated that groups find better solutions to sample problems when there is a tolerance for divergent thinking or multiple responses as opposed to the situation where only one response is considered appropriate. Measures of ideational fluency have varied from Guilford's (1959) test items that called for listing objects that are round and edible to Torrance's (1963) questions such as "What would happen if a hole were bored through the earth?" (p. 95) More recently Houtz and Coll (1979) investigated divergent thinking in college students through the application of a series of tasks. Their questions included "What would be the consequences of having an extra thumb on each hand?" and "What would be the consequences of having the power to read minds?" (p. 51).

Houtz and Denmark (1983) administered the Torrance Tests of Creative Thinking to elementary school students. The tests consisted of problems solving tasks, including questions about their perceptions of the focus and climate of the classroom. Ideational fluency was measured as the total number of relevant ideas. Fluency related significantly both

to student perceptions of emphasis on higher level thinking skills in the classroom and to a positive classroom climate.

Wait Time

Wait time, as a factor in the educational process, has been a line of research for over twenty years. As described by Rowe (1986)

> when teachers ask questions of students, they typically wait one second or less for the students to start a reply; after the student stops speaking they begin their reaction or proffer the next question in less than one second. If teachers can increase the average length of the pauses at both points, namely, after a question (wait time 1) and, even more important, after a student response (wait time 2) to three seconds or more, there are pronounced changes (usually regarded as improvements) in student language and logic as well as in student and teacher attitudes and expectations. (p. 43)

Tobin (1987) reported that wait time facilitated higher cognitive level learning by providing both teachers and students with time to think. He also compiled a survey of the various studies on the phenomena, but discovered that lack of universal agreement on the precise definition of wait time made it difficult to compare findings. Fowler (1975) distinguished four types of pauses (teacher reaction wait time, student reaction wait time, teacher initiated wait time, and student initiated wait time), but Tobin did not find this an accurate reflection of Rowe's description.

Tobin' ultimately suggested the following criteria and terminology:

> 1. Wait time TS: the pause following any teacher utterance and preceding any student utterance.
> 2. Wait time ST: the pause following any student utterance and preceding any teacher utterance.
> 3. Wait time SS: the pause following a student utterance and preceding an utterance from the same or a different student.
> 4. Wait time TT: the pause separating consecutive teacher utterances. (p. 90)

Rowe (1987) discovered the improvement in student language and logic as a consequence of the use of wait time as vital. "This social experiment called democracy depends in part for its survival on our ability to help students form wise answers to their questions. If we don't hear them, we can't help them" (p. 104).

Rowe (1974) had earlier postulated a relationship among wait time, schedule and sources of rewards, and fate control. Fate control is the "belief that events which happen to you or that may happen to you are in some measure under your own control" (p. 300). This is closely tied to the social learning theory of locus-of-control. Wait time increased the ability of students to take internal control of the situation and seize control of their own fate.

Researching the promotion of higher order thinking in the high school curriculum, Newmann (1991) studied social studies teachers and departments in 16 high schools. After a series of observations and interviews, they identified six dimensions that must be present for a lesson to promote the student's use of higher order thinking, with one being wait time. As described by Newmann, "in this class, students were given an appropriate amount of time to think, that is, to

prepare responses to questions" (p. 332). As further explanation, he added, "promoting thoughtfulness, therefore, requires periods of silence during which students can ponder the validity of alternative responses, develop more elaborate reasoning, and experience patient reflection" (p. 332).

Wait time is not the sole purview of educational research. Rochester (1973) reviewed an additional aspect of the significance of pauses in the area of psycholinguistics. These pauses, however, occur within units of discourse, a difference from both W T I and W T II which occur between units. Rochester described these pauses as either silent or filled and as reflective of both the cognitive and affective state of the speaker. The length of the pause was related to the degree of situational anxiety present as well as to the amount of control felt over the content being discussed. The more in control the speaker felt (both over the content and situation), the fewer pauses within thoughts.

Wait time can also be defined as a measure of time spent reflecting or studying a situation before responding. Hanninen (1988) studied the ability of teachers to respond to certain scenarios concerning gifted education and found that the more expertise the respondent possessed, the longer the reflection time and corresponding response.

Conditional Logic

Conditional logic gives language its form or structure by connecting sentences made up of descriptive words that are given meaning by specifying the individuals, their properties, or the relations among them to which they refer. Logical words are given specific meaning by giving the conditions for the truth or falsity of the compound sentences formed by means of the logical words (Brodbeck, 1963).

The use of conditional logic is rarely referred to in educational research and has been the subject of few studies. Smith and Meux (1970) and Hunkins (1974, 1976) investigated the incidence and importance of the use of conditional logic or conditional inferring but did not address the question of cause and effect. Smith and Meux (1970) found that differences exist in the use of logical categories both between subject areas and teachers within each area; however, they did not speculate on the effectiveness of one or the other.

Trimble (1986) referred to three studies that did address that question. Rosenshine (1969) found a positive correlation between linking words and student achievement; Gregory (1972) determined that students exhibited more growth in conditional reasoning ability while in classes where the teacher exhibited a higher frequency of such usage; and Gregory and Casteel (1975) verified earlier findings with a population of eighth grade mathematics students, though they

found significant negative correlation for eighth grade American history students.

Casteel and Gregory (1979) included the conditional move in the development of the TSOS. Their conditional move occurred if and only if the teacher provided logical premises in terms of which a conclusion was to be deduced. This move consisted of seven behaviors: (a) cued solicitation, (b) cued explanation, (c) linked solicitation, (d) linked explanation, (e) conditional statement, (f) hypothetico-deductive solicitation, and (g) hypothetico-deductive explanation (see Appendix A for definitions).

Hunt and Metcalf (1968) claimed the aim of reflective thought is to

> achieve warranted present-tense generalizations cast in the form of if-then propositions. These are of the nature of rules or principles. Their role is to predict and explain, and, applied in problematic situations, to suggest new hypotheses. Learning such generalizations makes transfer of training possible. The aim of all scientific inquiry is to achieve tested generalizations of this sort. This is what theory building is all about; and ultimately science is theory building and nothing else. (p 145)

Metcalf (1963) made reference to the work of Griffin (1942) in arguing that the work of teachers is reflective of their preparation. If they have not experienced reflective teaching, they will not use content reflectively. This may be due to the power of memories that must be challenged. As Kennedy (1991) noted,

> in order for teachers to alter these reliant beliefs, they must be introduced to an idea that is plausibly better and must be provoked to question their own

> experiences and to question the beliefs that are found in those experiences. (p. 21)

Kennedy's argument was consistent with that of Gleason (1978), who studied a group of student teachers over a 10 week period. He observed that they all used the positive moves of the TSOS at the beginning of their teaching assignment, but usage decreased significantly over time. He concluded that if student teachers are not given help and practice during their internship, effective behaviors will decline, particularly if the directing teacher does not model the behavior. Onosko (1991) tied this decline in the performance of the teacher to the culture of isolation that exists in most schools. Teachers rarely share or interact with their peers, thus having little opportunity to reinforce effective behaviors.

Ideational fluency, wait time or reflection, and conditional logic are all components of professional discourse. According to investigators following the traditions within professional education as well as other social sciences, the presence of these factors in the speech of individuals can be used to estimate their level of expertise.

CHAPTER 3
METHODOLOGY

The purpose of this study was to explore relationships between specific variables of teacher verbal behavior (ideational fluency, wait time, and conditional logic) and degree of expertise in the teaching of secondary social studies. This chapter describes the population and sample to be used in the study, the design and data collection procedures, the variables and related instrumentation to be used in measurement, the hypotheses to be tested, and the statistical treatment of the data.

Population and Sample

The population of the study consisted of secondary social studies teachers in north central Florida. Four specific subpopulations were identified--novices (graduates of traditional four year programs), novices (graduates of nontraditional fifth year programs), experts (those perceived to be expert), and non-experts (those perceived to be experienced, but not expert).

The novice populations consisted of all secondary social studies teachers with five or fewer years of experience. Two subpopulations of this group were identified based on

educational background. One group consisted of graduates of a fifth year program in social studies education. Ten such teachers were identified. Another group of novices was selected from those teachers within the novice population who had completed an approved four year teacher education program in social studies or the necessary postbaccalaureate coursework for certification.

The expert population (those with at least five years experience) was identified through the use of a panel consisting of the appropriate district level administrator and university personnel involved in the teacher education program. The evaluation instrument was the Expert Teacher Evaluation Instrument (Appendix B), based on the work of Casteel (1991), who operationalized the characteristics of the expert teacher based on earlier work by Berliner (1986) and research by Chi, Glaser and Farr (1988), de Groot (1978), Hanninen (1988), Huberman (1985), Kowalski and Weaver (1988), Schoenfeld and Herrmann (1982), Leinhardt and Greeno (1986), and others. This evaluation instrument identifies the distinguishing characteristics of expert teachers. Content validity is corroborated by the number of various studies supporting each of its component parts.

The panel was then instructed to use the characteristics as a whole to determine which teachers in the appropriate district would best be described as expert. Teachers were evaluated on each characteristic as to its presence or absence in their habitual behavior. Interrater agreement on

the evaluations was consistently high. Generalizability theory was used to establish the dependability and generalizability of these ratings (Cronbach, Gleser, Nanda, & Rajaratnam, 1972; Brennan, 1983; Shavelson & Webb, 1991). Those teachers selected for the sample were scored as possessing 13 or more of the identified characteristics.

The non-expert group was drawn from the population of those teachers with at least five years of experience, who were scored on the same expert evaluation instrument. The score for presence of characteristics on this group was 12 or lower.

Design and Data Collection Procedure

Structured interviews were conducted with each of the subjects using a variation on the planning questionnaire of the Florida Performance Measurement System (FPMS). This questionnaire was chosen to address the problems of respondent anxiety and threat (Bradburn, Sudman, & Associates, 1979). As an integral part of an ongoing teacher evaluation program in the state of Florida, this instrument was familiar to all participants to varying degrees. This allowed for both the stimulation of thought and openness of responses.

Planning is Domain 1 of the FPMS and consists of the following categories:

1.1 Content coverage.

1.2 Utilization of instructional materials.

1.3 Activity structures.

1.4 Goal focusing.

1.5 Diagnosis.

The State Department of Education developed a questionnaire to address these five categories (Appendix D). The teacher is asked about what their plans are for the upcoming day, including what content will be covered and how they came to the decision that their class was prepared for that material.

For the purposes of this study, changes were introduced in the questionnaire to better reflect the nature of planning at the unit level rather than daily level. Instead of being asked what they planned to teach during the next day, the subjects were given the more generic lead of what they were going to teach over the next week. This allowed for differences in scheduling and eliminated the chance of there being no class the next day (Appendix C).

Validity and reliability studies of the FPMS have concentrated on the summative instrument, which does not include Domain 1.0 (Peterson, Micceri, & Smith, 1985; Rothenberg & Hessling, 1990; Micceri, 1984). The planning domain does have content validity based on the extensive nature of its research base (Florida State Department of Education, 1983). The questionnaire is a direct rewording of those research findings. Its reliability is therefore only as good as each of those research findings. As a document,

there is no reliability data available. In this instance, the questionnaire is not being used as a measurable instrument, but as a projective device to allow subjects to speak freely about a subject about which they were familiar. Demographic data was also collected on each interviewee. This included such information as number of years teaching, academic degrees, age, and professional affiliations.

Interviews were conducted in person by one of three interviewers. Each interviewer was a certificated secondary teacher and used the same format. No time constraints were imposed by the interviewer, though most interviews took 15-30 minutes. Many subjects were familiar with their interviewer in his or her capacity as a member of the team responsible for student teaching at the university. In each case time was taken to establish the nature of the discussion and to eliminate any nervousness. All subjects were encouraged to treat the interviewer as a peer, who was able to understand their answers without excessive elaboration (Mishler, 1986; Spradley, 1979).

Interviews were taped and transcribed. Both transcriptions and tapes were used to measure the variables.

Variables

1. Ideational fluency was measured as the total number of relevant ideas presented in response to a particular question (Houtz and Denmark, 1983).

2. Wait time was measured as the reflection time between the end of the interviewer's question and the beginning of the substantive answer (Wait time I) and the reflection time within an answer (Wait time II) (Rowe, 1973). Utterances such as uhm and ah were not counted. Both individual times and a cumulative total over all questions were figured.

3. Conditional logic was measured as the total instances of specific words or phrases identified by Casteel and Gregory (1979) in their conditional move. The exception, as noted by the researchers was the exclusion of hypothetico-deductive solicitations and hypothetico-deductive explanations, as being covered by other categories.

4. In the case of both fluency and logic, overall totals were figured. Scoring was done by two trained scorers, with interscorer reliability established at greater than .90.

Hypotheses

The following hypotheses were tested:

1. There is no difference between members of any two subpopulations with regard to fluency.

2. There is no difference between members of any two subpopulations with regard to the use of wait time.

3. There is no difference between members of any two subpopulations with regard to the use of conditional logic.

4. The score on wait time is not affected by the score on fluency.

5. The score on wait time is not affected by the score on conditional logic.

Statistical Treatment of Data

The researcher generated a multiple regression with three qualitative variables and four groups to determine significance in each case. The equation used in each case varied depending on the information required. The first three hypotheses reflected the fact that there was no significant difference between the members of each subpopulation on each of the variables. The fourth and fifth hypotheses reflected the fact that both ideational fluency and use of conditional logic could be seen as contributing to the reflectivity of the subject (Schon, 1983). Such contributory relationships between the other combinations of variables were not supported by the literature.

The null hypotheses were as follows:

1. H_o: Fluency is not affected by subpopulation.
2. H_o: Wait time is not affected by subpopulation.
3. H_o: Conditional logic is not affected by subpopulation.
4. H_o: Wait time is not affected by fluency.
5. H_o: Wait time is not affected by use of conditional logic.

Alternative hypotheses were as follows:

1. H_a: Fluency is affected by subpopulation.
2. H_a: Wait time is affected by subpopulation.
3. H_a: Conditional logic is affected by subpopulation.
4. H_a: Wait time is affected by fluency.
5. H_a: Wait time is affected by use of conditional logic.

The equation used to test hypotheses 2, 4, and 5 was $y=\alpha+\beta_1x_1+\beta_2x_2+\beta_3x_3+\beta_4x_4+\beta_5x_5+\varepsilon$; where, y was reflection score (wait time), x_1 was covariate 1 (fluency) and x_2 was covariate 2 (conditional logic). In all equations x_3, x_4, and x_5 represented the Novice (trad), Novice (nontrad), and Non-expert groups respectively. The Expert group was coded as zero.

The equation to test hypothesis 1 was $y=\alpha+\beta_1x_3+\beta_2x_4+\beta_3x_5+\varepsilon$; where, y represented ideational fluency and x_3, x_4, and x_5 are as defined above.

The equation to test hypothesis 3 was $y=\alpha+\beta_1x_3+\beta_2x_4+\beta_3x_5+\varepsilon$; where y represented conditional logic and x_3, x_4, and x_5 are as defined above.

CHAPTER 4
ANALYSIS OF DATA

This chapter consists of four sections. Section one describes the samples of the four subpopulations. Section two applies generalizability theory to the Expert Teacher Evaluation Instrument. Section three analyzes the data relating to each of the five hypotheses, and section four presents the relationships between group membership and the various dependent variables.

Description of Samples

The sample consisted of four groups of secondary social studies teachers. All participants taught in the public school systems of North Central Florida at the time of their interviews. The teaching experience of each group is described in Table 1, sex and teaching assignment are described in Table 2.

Group 1--Experts

The group called Experts consisted of five males and five females. Their experience ranged from 6 to 32 years with a mean of 14.1 and a standard deviation of 7.85. Their current teaching assignments were four in senior high school

and six in middle school settings. They scored an average of 14.64 out of a possible 16 on the Expert Teacher Evaluation Instrument with a standard deviation of .64.

Table 1

Experience Levels (in Years) by Groups

Group	n	M	SD
Novice			
Trad	9	2.56	1.67
Nontrad	10	2.20	1.23
Expert			
Yes	10	14.10	7.85
No	9	20.00	6.65

Table 2

Breakdown of Groups by Sex and Teaching Level

Group	m	f	MS	HS
Novice				
Trad	4	5	5	4
Nontrad	7	3	6	4
Expert				
Yes	5	5	6	4
No	6	3	4	5

Group 2--Non-experts

The group called Non-experts consisted of six males and three females. Their experience ranged from 7 to 30 years with a mean of 20.00 and and standard deviation of 6.65. Their current teaching assignments were five in senior high and four in middle school settings. They scored an average of 4.22 on the Expert Teacher Evaluation Instrument with a standard deviation of 1.79.

Group 3--Novices (nontraditional)

The group called Novice (nontraditional) consisted of seven males and three females, all of whom graduated from the fifth year PROTEACH program at the University of Florida. Their experience ranged from 1 to 5 years with a mean of 2.20 and a standard deviation of 1.23. Their current teaching assignments were four in senior high and six in middle school settings.

Group 4--Novices (traditional)

The group called Novice (traditional) consisted of four men and five women. They were all certified social studies teachers in the state of Florida. Their educational background included a bachelor's degree and in three cases a master's degree. Two of those master's degrees were in history with postbaccalaureate coursework in education for

teacher certification purposes. The experience of this group ranged from 1 to 5 years with a mean of 2.56 and a standard deviation of 1.67. Their current teaching assignments were four in senior high and five in middle school settings.

Generalizability of Expert Teacher Evaluation Instrument

In order to determine the reliability, or generalizability, of the Expert Teacher Evaluation Instrument, the researcher applied generalizability theory. This allows a review of the consistency of rank orderings by raters to establish the limitations of the instrument. According to Shavelson and Dempsey-Atwood (1976), generalizability theory "concerns the adequacy with which one or several observations on a person can be generalized over all possible observations in which the decision maker and researcher are interested (p. 554)." The decision maker is rarely interested in the particular response given to a particular stimulus at a particular moment. There is a universe of observations, any of which would allow the decision to be made. The ideal datum, according to Cronbach et al. (1972), would be "something like the person's mean score over all acceptable observations (p. 15)." (This is called the "universe score" and is similar to the "true score" of classical test theory.) "The investigator uses the observed score or some function of it as if it were the universe score. That is, he generalizes from sample to

universe. The question of 'reliability' thus resolves into a question of accuracy of generalization, or generalizability (p. 15)."

The coefficient of generalizability is defined as the ratio of universe score variance to the expected observed score variance. It expresses, on a 0-to-1 scale, the proportion of variance in observed scores which is due to universe score variance (similar to a reliability coefficient). To determine the coefficient of generalizability, the researcher analyzed the ratings by the various panel members for the 19 subjects as follows:

1. Generate a repeated measures analysis of variance to obtain the variance components, applying the formulas for determining the variance components for the ratings, subjects and the interaction between ratings and subjects (see Table 3).

2. Calculate the universe score and error variances (see Table 4). Generalizability theory defines two types of error variance. Relative error variance concerns the variation in ratings with regard to their relation to the ratings of other subjects. Absolute error variance is a more conservative figure that deals with the consistency of scores on an absolute scale (i.e., not relative to others). Due to the nature of the Expert Teacher Evaluation Instrument, the researcher selected the absolute error variance as not only more conservative, but more appropriate in that it revealed

Table 3

Repeated Measures ANOVA and Variances from Expert Teacher Evaluation Instrument Ratings

Source	df	SS	MS	$\hat{\sigma}^2$
Rating	2	62.84	31.42	1.5*
Subject	18	1640.60	91.14	29.3**
RxS, Error	36	117.82	3.27	3.3***

* $[MS(R)-MS(RxS)]/n_s$

** $[MS(S)-MS(RxS)]/n_r$

*** MS(RxS)

not just how the subjects scored in relationship to one another, but their actual numeric score.

3. Estimate the generalizability coefficient using the formula: G-coefficient = $\hat{\sigma}_S^2/(\hat{\sigma}_S^2 + \hat{\sigma}_{ERR}^2)$

Applying both versions of the error term, averaging across three raters ($n_r' = 3$), the result is:

G-coefficient (relative) = .96

G-coefficient (absolute) = .95

A coefficient of .95 indicates a strong degree of reliability, or generalizability. Thus, it helps confirm the consistency of the Expert Teacher Evaluation Instrument with three raters. To further explore the validity of the instrument, the significance of the difference in scores for

the two groups of experienced teachers, was examined with an independent sampels t-test. A t-score of 16.47 proved significant ($p < .001$).

Table 4

Universe Score and Error Variances for Expert Teacher Evaluation Instrument with Formulas

TYPE	FORMULA	VARIANCE COMPONENT
Universe Score Variance	$\hat{\sigma}_S^2$	29.2904
Relative Error Variance	$\hat{\sigma}_{RxS}^2/n'_R$	1.0910
Absolute Error Variance	$\hat{\sigma}_R^2/n'_R + \sigma_{RxS}^2/n'_R$	1.5848

Note.

n'_R is the number of raters averaged across. In this study, a score was determined by averaging three ratings on each subject; thus, $n'_R = 3$.

Analysis of Data Relating to Hypothesis One

Hypothesis one stated that there is no difference between members of any subpopulation with regard to fluency. The researcher measured ideational fluency as the total

number of relevant ideas presented in response to a particular question (Houtz & Denmark, 1983). Because of the open ended nature of the questions, many subjects presented ideas relevant to several questions during a single response. An idea was therefore considered relevant if it could be seen as applicable to any of the questions within the interview. The numbers analyzed reflect the cumulative totals across all ten questions (see Appendix G).

An idea could be presented in few words or a lengthy discourse and be counted as a single response. Some statements contained multiple ideas, while others might contain none at all. By coding the transcripts in this manner, responses that were not relevant to any of the questions on the interview were eliminated. Several subjects got involved in rather extensive anecdotes that though interesting, could not be viewed as responsive and were not counted.

The same researcher coded all subjects. To establish reliability, a second researcher coded 25% of the subjects. The main researcher trained this coder as to the procedures involved. Though coding on individual questions varied as much as three, the overall correlation between coders was .975 (interscorer reliability).

The scores on fluency ranged from a low of 13 to a high of 52 with an overall mean of 30.26. The subpopulation means are shown in Table 5.

To establish the significance or non-significance of the differences between the subpopulations, the researcher generated a series of multiple regression models with fluency as the dependent variable and each of the subpopulations defined by the independent variables (see Table 6). Follow up t-tests were run using the pooled standard error. Given the small size of the sample (n), and the lack of any serious negative consequences to a Type I error, the alpha was not adjusted in the follow-up tests. A significant difference ($p < .05$) was detected between the following pairs (see Table 7):

1. Novice (trad) (22.56)/Novice (nontrad) (34.30)
2. Novice (trad) (22.56)/Expert (39.60)
3. Novice (nontrad) (34.30)/Non-expert (23.11)
4. Non-expert (23.11)/Expert (39.60).

No significant difference was detected between the following pairs:

1. Expert (39.60)/Novice (nontrad) (34.30)
2. Non-expert (23.11)/Novice (trad) (22.56).

Analysis of Data Relating to Hypothesis Two

Hypothesis two stated that there is no difference between members of any subpopulation with regard to the use of wait time. Wait time I is the reflection time between the end of the interviewer's question and the beginning of the substantive answer (Rowe, 1973). Wait time II measures the

Table 5

Mean Scores for Discourse Variables by Group

Group	Fluency		Wait time		Logic	
	M	SD	M	SD	M	SD
Novice						
Trad	22.56	8.28	26.81	9.77	2.56	3.81
Nontrad	34.30	9.37	22.28	8.58	4.10	2.42
Expert						
Yes	39.60	7.04	23.54	7.64	5.70	4.14
No	23.11	7.57	31.12	7.57	1.89	2.15

Table 6

Regression Model with Fluency as Dependent Variable

Variable	Regression Coefficient	SE	t-test
Intercept**	39.60	2.57	15.416
Non-Expert	-16.49	3.73	-4.418*
Nov(Trad)	-17.04	3.73	-4.567*
Nov(Nontrad)	- 5.30	3.63	-1.459

Note. * $p < 0.05$.

** Intercept represents mean for experts while other coefficients are deviations from expert mean.

Table 7

T-tests for Pairwise Comparisons on Fluency

	Novice		Expert	
	Trad	Nontrad	Yes	No
Novice				
Trad	---			
Nontrad	3.147*	---		
Expert				
Yes	4.567*	1.459	---	
No	0.145	2.998*	4.418*	---

Note. *$p < 0.05$.

reflection time within an answer. All interviews were taped and subsequently replayed by the researcher. The researcher used a stop watch to measure both wait time categories.

Because of the use of a mechanical stop watch, a second coder was unnecessary. The subjects in these interviews rarely, if ever, employed wait time II. When pauses occurred within a response, it was indicative of completion of the answer, not reflection and further elucidation. The researcher compiled times for all ten questions including all instances of both Wait time I and II, analyzed the data using the cumulative totals only. In one instance a mechanical failure with the tape recorder occurred during the interview and it was recorded at an inappropriate speed. This

malfunction did not hinder the transcription of the tape, but made an accurate assessment of reflection impossible. For this reason, there is one less subject in the Non-expert group on this variable.

The overall average total wait time was 25.63 seconds. Times ranged from a low of 9.52 to a high of 56.94. Individual group means are shown in Table 5.

To establish the significance or non-significance of the differences between the subpopulations, the researcher generated a multiple regression model with wait time as the dependent variable and each of the subpopulations defined by the independent variables (see Table 8). Follow up tests (as described previously) indicated that significant difference ($p < .05$) occurred between the following pairs (see Table 9):

1. Non-expert (31.12)/Novice (nontrad)(22.28)
2. Non-expert (31.12)/Expert (23.54).

No significant difference occurred between the following pairwise comparisons:

1. Novice (trad) (26.81)/Novice (nontrad) (22.28)
2. Expert (23.54)/Novice (nontrad) (22.28)
3. Expert (23.54)/Novice (trad) (26.81)
4. Non-expert (31.12)/Novice (trad) (26.81).

Analysis of Data Relating to Hypothesis Three

Hypothesis three stated that there is no difference between the members of any subpopulation with regard to the use of

conditional logic. The researcher measured conditional logic as the total number of instances of specific words or phrases identified by Casteel and Gregory (1979) in their conditional move. The conditional move occurred if and only if the teacher provided logical premises in terms of which a conclusion was to be deduced. This move consists of seven behaviors, as shown in Appendix A. The exception, as noted by the researchers was the exclusion of hypothetico-deductive

Table 8

Expanded Regression Model with Reflection as Dependent Variable

Variable	Regression Coefficient	SE	t-test
Intercept**	7.58	9.04	0.838
Fluency	.33	.24	1.412
Logic	.49	.58	.844
Non-Expert	15.30	6.04	2.532*
Nov(Trad)	10.48	5.84	1.796
Nov(Nontrad)	1.28	4.60	0.280

Note. * $p < 0.05$.

** Intercept represents mean for experts while other coefficients are deviations from expert mean.

Table 9

T-tests for Pairwise Comparisons on Reflection

	Novice		Expert	
	Trad	Nontrad	Yes	No
Novice				
Trad	---			
Nontrad	1.765	---		
Expert				
Yes	1.796	0.280	---	
No	0.997	2.600*	2.532*	---

Note. *$p < 0.05$.

solicitations and hypothetico-deductive explanations, as being covered by other categories.

For the use of the coders, the researcher developed a listing of those words or phrases (see Appendix E). The coders enumerated the instances of conditional logic in the transcripts by using this list in conjunction with the definitions of each category. The specific words or phrases needed to appear in the appropriate context to be counted as instances of the conditional move.

The same researcher coded all transcripts. To establish reliability, a second researcher (trained by the main researcher) coded 25% of the subjects. Although coding on

individual questions varied, the overall correlation between coders was .993.

The overall usage of conditional logic ranged from a low of 0 to a high of 13 instances, with a mean of 3.63. The subpopulation averages are shown in Table 5.

To establish the significance or non-significance of the differences between the subpopulations, the researcher generated a multiple regression model with conditional logic as the dependent variable and each of the subpopulations defined by the independent variables (see Table 10). Follow up t-tests showed significant differences ($p < .05$) for the following pairs (see Table 11):

1. Expert (5.70)/Novice (trad) (2.56)
2. Expert (5.70)/Non-expert (1.89).

No significant difference occurred in the following pairs:

1. Novice (trad) (2.56)/Novice (nontrad) (4.10)
2. Expert (5.70)/Novice (nontrad) (4.10)
3. Non-expert (1.89)/Novice (nontrad) (4.10)
4. Non-expert (1.89)/Novice (trad) (2.56).

Analysis of Data Relating to Hypotheses Four and Five

Hypothesis four stated that the score on wait time is not affected by the score on fluency. Hypothesis five stated that the score on wait time is not affected by the score on conditional logic. The researcher generated a multiple

Table 10

Regression Model with Logic as Dependent Variable

Variable	Regression Coefficient	SE	t-test
Intercept**	5.70	1.03	5.539
Non-Expert	-3.81	1.50	-2.549*
Nov(Trad)	-3.14	1.50	-2.103*
Nov(Nontrad)	-1.60	1.46	-1.099

Note. * $p < 0.05$.

** Intercept represents mean for experts while other coefficients are deviations from expert mean.

Table 11

T-tests for Pairwise Comparisons on Conditional Logic

	Novice		Expert	
	Trad	Nontrad	Yes	No
Novice				
Trad	---			
Nontrad	1.033	---		
Expert				
Yes	2.103*	1.099	---	
No	0.435	1.479	2.549*	---

Note. *$p < 0.05$.

regression model with wait time as the dependent variable and both fluency and conditional logic as two of the independent variables (see Table 8). The results found were not significant at the .05 level for either variable.
After failing to reject the null hypothesis for both hypotheses four and five, the researcher subsequently generated the model without the variables of fluency and conditional logic (see Table 12). In the original expanded model the combination of the variables and group membership accounted for 22% of the variation in reflection score. In the reduced model (without the two variables), group membership alone accounted for almost 10.5% of the variation.

Relationship between Group Membership and Dependent Variables

The percentage of variation in the various dependent measures can be partially accounted for by group membership. Other unidentified variables (and error) accounted for the rest of the variation. As mentioned previously, group membership accounted for 10.5% of the variation in wait time. In the case of ideational fluency, group membership accounted for 47.5% of the variation. In the case of conditional logic, group membership accounted for 18.7% of the variation in scores.

Table 12

Reduced Regression Model with Reflection as Dependent Variable

Variable	Regression Coefficient	SE	t-test
Intercept**	23.54	3.25	7.233
Non-Expert	7.58	4.88	1.552
Nov(Trad)	3.28	4.73	0.693
Nov(Nontrad)	-1.26	4.60	-0.273

Note. * $p < 0.05$.

** Intercept represents mean for experts while other coefficients are deviations from expert mean.

CHAPTER 5
SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

This chapter contains five sections. The first section is a summary of the research study including the research problem and the investigation design. Section two contains a summary of the results presented in Chapter IV. In the third section, conclusions and implications derived from the data are discussed. Section four contains a discussion of recommendations for future research and section five is a discussion of recommendations for teacher education.

Summary of Research Study

The purpose of this study was to explore the relationships between three variables of teacher discourse (wait time or reflection, ideational fluency, and conditional logic) and the degree of expertise in the teaching of secondary social studies. The population consisted of 38 secondary social studies teachers in north central Florida. Four subpopulations were compared. Population membership was determined by years of experience. Those with five or fewer years of experience were further divided based on the type of teacher education program completed by the subject. Those who had graduated from a traditional four year program or had

taken post-baccalaureate coursework to achieve certification were classified as Novices (Traditional). Those teachers who had completed the fifth year program at the University of Florida (PROTEACH) were classified Novices (Nontraditional), representing a prototypical extended/integrated teacher education program. Those subjects who had at least five years of experience were also subdivided. Through the use of the Expert Teacher Evaluation Instrument, the experienced teachers were evaluated as to their level of expertness. Those scoring 13 or higher on the scale were labelled Experts. Those scoring 6 or lower on the scale were labelled Non-Experts. The sample consisted of 9 Novice (Traditional), 10 Novice (Nontraditional), 10 Experts, and 9 Non-Experts.

Structured interviews were conducted with each of the subjects using a variation on the planning questionnaire of the Florida Performance Measurement System. The interview dealt with the planning process. In particular, it addressed the specific plans of each teacher for their next unit of study (1-2 weeks). Each interview was taped and transcribed. Both tapes and transcriptions were used to measure the three variables.

The three variables were measured as follows:

1. Wait time was measured as the reflection time between the end of the interviewer's question and the beginning of a substantive response.

2. Ideational fluency was measured as the total number of relevant ideas presented in response to the questions.

3. Conditional logic was measured as the total number of instances of specific words or phrases identified as conditional.

The research questions addressed the differences between the various groups with regard to each of the variables, as well as the possibility of an interaction between fluency and logic in regard to reflection. A series of multiple regression models with three qualitative variables and four groups were generated.

Summary of Results

With regard to the results of the tests involving the ideational fluency of the subject groups, two of the pairwise comparisons produced no significant difference in score. These were the Expert/Novice (Nontraditional) pair and the Non-expert/ Novice (traditional) pair. All other pairwise comparisons revealed significant differences.

Regarding the results of the tests involving the reflection or use of wait time between the groups, the only significant difference was found between the Non-experts and both the Experts and Novices (Nontraditional). The Non-experts had a considerably higher rate of reflection than either of the other two groups, though not in comparison with the Novices (traditional).

Regarding the results of the tests involving the use of conditional logic by members of each group, the only

significant difference was found between members of the Expert group and those in either the Non-expert or Novice (Traditional) groups, though not in comparison with the Novices (Nontraditional).

The combination of fluency and logic had a mild, but inconclusive impact on the reflection time. The interaction appeared to account for slightly more than 10% of the variance by group.

Looking at these results by group membership instead of variable, the results are as follows:

1. For the Novice (traditional)/Novice (Nontraditional) pair, the only significant difference was on fluency.

2. For the Novice (traditional)/Expert pair, there was significant difference on both fluency and logic, but not reflection.

3. For the Novice (Nontraditional)/Non-Expert pair, there was significant difference on both reflection and fluency, but not logic.

4. For the Expert/Non-Expert pair, there was significant difference on all three variables.

5. For the Novice (Nontraditional)/Expert pair, there was no significant difference on any variable.

6. For the Novice (traditional)/Non-Expert pair, there was no significant difference on any variable.

Conclusions and Implications

The initial research question addressed the differences between groups with regard to the ideational fluency of the group member. As shown in Chapter IV, the Expert and Novice (Nontraditional) groups showed no significant difference in score in this area. The Non-expert and Novice (traditional) groups also showed no significant difference in score. There does exist, however, a significant difference between the scores of the two pairs. The Expert pair score significantly higher on this variable. This conjunction of groups is seen throughout the findings.

The fact that the Expert pair presented more relevant ideas when interrogated about their planning suggests that they are a more creative group. Torrance (1963) and Houtz and Denmark (1983) both equated high scores on ideational fluency with creativity. This higher degree of creativity can also be seen as indicative of the non-technical aspect of teaching. As Welker (1992) discussed in his book on expertise, the profession of teaching is so diverse in its requirements, that the standard measures of expertise do not apply. Berliner (1986), however, concentrated on the more technical aspects of teaching. Where, in physical activity such as ice skating, the level of expertise is evident through the technique; in teaching, there are multiple other factors to be considered. The fact that the group of teachers

considered to be Experts scored high on creativity confirms Welker's thesis.

By the same logic, those teachers who were not deemed Expert, would appear to be more technically centered. Their lower scores on ideational fluency implies a lack or lessened degree of creativity. That portion of teaching that flourishes with the creative mind is missing (or at least less pronounced) in this group.

The Novice populations in this study divided up on similar grounds. The Traditional novices with their four year or "course count" preparation showed no significant difference from the Non-experts. The Nontraditional novices with their fifth year program of study showed no significant difference from the Experts. This does not give those novices expert status. It means that for this one characteristic, they are similar. Likewise, the Traditional novices are not labelled as Non-expert, but share this characteristic with that group.

Regarding reflection as seen through the use of wait time, the only group to score significantly different (higher) was the Non-expert group. Whereas a high score in fluency indicated higher creativity, a high score in wait time was not as positive an indicator. Originally, the researcher thought that wait time would be a positive indication of expertise. The fact that the Expert group was able to respond to questions about planning with less reflection time indicates that the interview contained

questions with which the teachers had already grappled and resolved. Answers did not require deep thought. The schemata were already in place and simply needed to be recalled. Clark and Yinger (1987) stated that it takes up to five years for those schemata to gain permanence in the mind of the teacher. These results seem to indicate that for three of the four groups, they are in place. The Non-experts are not as organized in their thinking about the subject. Long term planning is not imbedded in their minds. This fact combined with their lesser degree of creativity is another indication of the reason for their not being considered Experts.

For the two Novice groups, the lack of reflection time also relates to the fact that they have already thought deeply about the questions. The schemata of planning may not be entrenched in their minds, but the necessity and relevance of planning is clear to them. Novices from either preparation program have learned a set of commonplaces that they use as explicit scaffolds for the construction of lessons or sets of lessons. The difference scores for fluency imply that the Nontraditional group has a more complex set of strategies and scaffolds, while the traditional group is working at a more simplistic level.

Had follow-up questions been asked regarding unforeseen contingencies or some other form of disruption, it might have been possible to see the previously anticipated degree of reflection in the Expert and Nontraditional novice groups. By

forcing them into unanticipated situations, the previous thought or scaffolding might not hold.

In the area of conditional logic, the only group to show a significant difference was the Experts with regard to the Non-experts and Novice (Traditional) groups. The Novice (Nontraditional) group showed no difference to any of the groups. This indicates that though the particular responses had their own internal logic, the specific format of conditional logic was not verbalized. There is no way of extrapolating from this data to determine if these teachers employ conditional logic within their teaching repertoire. From Gregory (1972) and Gleason (1978), it is known that this is a technique that will result in improved student performance. Neither of these studies, however, addresses the social or non-classroom use of conditional logic.

Beyond the three specific variables, this study has revealed several characteristics of two key groups, Experts and Novices (Nontraditional). Across all three variables, they showed no significant differences. From these data, it is not possible to state that they are the same. It is possible to state that they showed striking similarities regarding these specific discourse variables. Similarly, it is possible to state that the Novices (Traditional) differed significantly from the Experts in the areas of fluency and logic. The two novice groups were also similar to each other in the area of logic and reflection. There seems to be a contradiction, in that while the novices resembled each

other, only the nontraditional group resembled the Experts in all three areas. One way to resolve this contradiction would be to argue that the nontraditional novices were closer to being experts than they were to being like their traditionally prepared peers.

The differences between the two novice populations revolve around the type of preparation program in which the teacher participated. The members of the Traditional group each had the requisite coursework, but in a variety of programs that make little or no effort to integrate the pedagogical and content area knowledge. The Nontraditional novices completed an extended program that stressed the integration of knowledge. The number of credit hours may be similar between the two groups, but what transpired during those hours may be quite dissimilar.

The fact that the Nontraditional novice population had all completed their Master's degree may play a role in the differences that appear. If that is the case, then those Traditional novices who also have a Master's degree would be expected to score closer to the Nontraditional group than to that part of the Traditional group who have no graduate credits. The problem with deriving this information from the available data is that the number of subjects is so small. There are only three members of the Traditional group with Master's degrees. With a sample that small, it is impossible to make any conclusions (Table 13).

Table 13

Mean Scores of Novice (Traditional) by Degree

	n	Fluency	W T	Logic
Degree				
MA	3	21.67	19.03	3.67
BA	6	23.00	30.71	2.0
Group				
Trad	9	22.56	26.81	2.56
Nontrad	10	34.30	22.28	4.10

Conclusions about the Expert population in regard to the Non-experts are clearer. The Expert Teacher Evaluation Instrument is shown to be a valid and reliable assessment of teacher expertise. The results of the generalizability analysis indicate that this instrument can be added to the work of Berliner (1986) and Shulman (1987) in further elucidating the realm of expert teaching. As mentioned in Chapter 1, a major problem of the earlier studies was ecological validity (Neisser, 1976). According to Neisser, a theory can change the beliefs of a whole society if that theory has something relevant to say about what people do in real, culturally significant situations. If the theory lacks these qualities, it will be abandoned sooner or later. Through the use of field site interviews and the Expert Teacher Evaluation

Instrument, the question of ecological validity has been addressed in this study.

Throughout this data, one conclusion resounds--Experts are different from Non-experts. The two groups showed significant difference on all three variables. Experts are more fluent, faster to respond, and use more conditional logic.

Recommendations for Future Research

For every answer this study provided, several additional questions surfaced. Future research should first try to eliminate the limitations incumbent in the current study. These limitations include sample selection, incomplete background data on the subjects, and the choice of variables to be studied. Each of these limitations will be discussed with possible research designs.

Sample Selection

For the purposes of this study, the sample was limited to secondary social studies teachers in North Central Florida. This sample of convenience should be expanded in future studies. The increased sample size will add power and validity to the results of the study. There are several ways in which this might be accomplished.

1. The one subpopulation within the current design that is limited in number in that of Novice (Nontraditional). The

population of PROTEACH graduates within the five year window of opportunity is approximately 75. Not all are currently certified and teaching in Florida. Assuming the ability to interview two-thirds of them, the sample size would grow five-fold. Two hundred total interviews would certainly provide a more accurate assessment of these variables.

The Expert Teacher Evaluation Instrument panels would need detailed instructions and orientation to maintain the quality of selection and the high level of generalizability of the instrument. However, if ten experts were available in one section of the state, the prospects of finding an additional 40 across the teaching population are heartening.

By expanding beyond the physical zone of convenience, one should obtain the same results in many of the comparisons. Only in those cases, such as logic, where the numbers are small, would it be anticipated that different results might be found.

2. Another way to expand the sample would be to eliminate the requirement that all participants be social studies teachers. There is no reason to believe that expanding the sample to include a variety of content areas would alter the results. Casteel (1991) and Berliner (1986) drew on research in a number of subject areas in their development of the ideal type concept of the expert teacher. None of the characteristics in the Expert Teacher Evaluation Instrument, which is derived from that research, are content specific. On the other hand, because of the design of the

PROTEACH program, differences might very well exist. Along with the generic general methods of teaching component of the program, each subject area has intentionally designed its own special methods course. The representation and transformation of content is directly related to the ongoing research in the particular academic discipline. As new information is discovered, the special methods courses evolve.

Within the five year framework for identifying novices, some 400 students have completed PROTEACH. To identify and locate them all would be impossible. Of those located, a small percentage would have left the field or state. Using the two-thirds number as an optimistic estimate would yield a subpopulation of approximately 200-250 subjects. Expanding those numbers to the entire study would produce a sample of 800-1000. Such number are not only unwieldy, but unnecessary. A random sampling of that larger population would produce results with broader validity and generalizability than in the present study.

If differences are found between Novices in the various content areas, the need for follow-up studies would be indicated to determine what facets of the special methods courses produced the divergent results. No differences between Novices would indicate that the general methods portion of the program would be investigated as well. If no differences between Experts in the various content areas are found, the Expert Teacher Evaluation Instrument would be

further confirmed in its ability to identify experts across subject areas.

3. An expansion of the sample to include graduates of other extended/integrated fifth year programs other than the University of Florida would add not only numbers, but diversity to the mix. There are numerous innovative programs around the country and their graduates would surely fit into the Novice (nontraditional) category in this study. It would be necessary to add a balance of subjects from each group to avoid any kind of regional bias to the study.

Background Data Collection

The current study implies a difference between the Expert and Non-Expert subpopulations. Since both groups completed their pedagogical preparation in similar undergraduate programs, the source of their divergence must lie elsewhere. Two possibilities include the internal (personality) and the external (workplace) forces that intervene or have intervened in the life/work history of the subject. To uncover what critical incidents have helped shape the person, additional biographic information would be required. This data might be collected through an expanded set of demographic questions added to the current questionnaire. These questions would be aimed at isolating and identifying the particular situations or persons that

have impacted on the professional or preprofessional development of the subject.

Ethnographic interviewing, as described by Spradley (1979), would also seem an effective technique for unveiling this type of information. One or two subjects from each group would be selected and interviewed extensively. Transcripts would be studied and analyzed qualitatively looking for instances of critical interest.

Choice of Variable

In reaching the decision as to which variables to identify in the current study, many were considered but only three were chosen. Among the variables not chosen were several that would add depth and interest to the research.

1. The concept of vagueness versus clarity in verbal presentation has been studied in the lecture format of instruction (Hiller, 1971; Hiller, Gisher, & Kaess, 1969; Hiller, Marcotte, & Martin, 1969; Smith, 1984, 1985; Smith & Cotten, 1980). The researchers have identified a list of inherently vague words and phrases such as some, few, a bit, a little while, and stuff. By tallying instances of these words in the interview transcripts, it would be possible to make inferences about the clarity and focus of the speaker. The current state of computer technology would allow this process to be conducted quickly and efficiently.

2. Smith and Cotten (1980) also looked at continuity versus discontinuity in presentational style. This concept concerns the ability to maintain a line of reasoning through to its conclusion without distraction or diversion. Fragmentation of thought is seen as leading to student confusion and lower performance. The current transcripts could be analyzed for this variable as well by looking at the number of times the speaker changes focus or topic within one answer.

3. Newmann (1991) presented a series of models for the teaching of higher order thinking skills. Higher order thinking is defined as challenge and expanded use of mind, coming from interpretation, analysis, and manipulation of information. It is Newmann's contention that there are observable qualities of classroom activity that would help students achieve higher order thinking skills. This atmosphere of thoughtfulness comes from presenting higher order challenges and helping student apply their knowledge and skills in solving them.

A list of criteria for classroom thoughtfulness was developed which included the following minimal requirements for a thoughtful lesson:

1. There was sustained examination of a few topics rather than superficial coverage of many.

2. The lesson displayed substantive coherence and continuity.

3. Students were given an appropriate amount of wait time to prepare responses.

4. The teacher asked challenging questions and/or structured challenging tasks.

5. The teacher modelled thoughtfulness.

6. Students were required to offer explanations and reasons for their conclusions.

Applying selected elements of Newmann's scale of thoughtfulness to the interview transcripts would be possible. This would provide a good indicator of the subject teacher's intent to promote higher order thinking. It would be expected that Expert teachers would score higher on Thoughtfulness.

3. The variables considered in the current study were all discourse related. A logical next step would be to look at the technical skills shown by the subjects in association with their completion of various instructional functions. Rather than measuring the variables within the interview format, they would be measured in the classroom setting. Such observational data gathering would also allow for the confirmation of the correlation between collegial discourse and classroom practice. Grimshaw (1989) discussed the fact that naturally occurring conversational discourse is a source of sociological data. Discourse among peers uses a different vocabulary than that among non-peers. The connection to professional practice needs to be better established. Such a connection would also support Newmann's thesis. For the

purposes of observation, such characteristics as mystification and fragmentation (McNeil, 1986) would be of interest. Having to do primarily with the structure and presentation of lecture materials, the presence of these characteristics would imply a less than expert teacher. It would be expected that the Novice (Nontraditional) group would avoid these techniques.

Recommendations for Teacher Education

In the area of preservice teacher education, recommendations are as follows:

1. If the ideal-type concept of the expert teacher has been shown to have construct validity and Expert and Non-expert teachers are indeed different and identifiable, it becomes incumbent upon college of education faculties to make every effort to place student teachers with the best possible cooperating teacher. Given the option of an Expert or a Non-expert, the choice must be made in favor of the Expert. Student teaching is considered the single most influential segment of preservice education (Casteel & Banks, 1990). To subject novices to less than the best is inappropriate.

2. During the preservice teacher education program, students are provided with explicit and tacit scaffolds for planning. When those students are placed in either a student teaching or beginning teacher situation, they instinctively rely on those frameworks. If the scaffold that has been

taught to the students is not congruent with that in use by the cooperating teacher or beginning teacher supervisor, conflict can arise. In many instances, PROTEACH students have been accused of not planning, when the reality of the situation is that they are planning extensively, just not in the same formalistic manner of their cooperating teacher. An Expert might be better able to recognize this situation and work with it, a Non-expert less able.

A solution to this problem would be to implement the previous recommendation and not use the Non-expert. That is not totally realistic. It is realistic to expect the college to conduct orientation sessions with cooperating teachers where they are shown the same scaffold or framework that their student teachers have learned. Working in a cooperative workshop setting would allow these teachers to voice their concerns and avoid later confrontations.

3. The fact that graduates of an integrated, fifth year program of teacher education are scoring in the same range as identified Experts, speaks strongly for both parts of the program. Integration of pedagogy and content throughout the course of study is layered upon the knowledge that the students have already completed a degree in a content area. It is possible that innovative programs could be developed to stress the integration of content and theory while the student is still working on the undergraduate degree, but this step would involve a deep commitment from all departments of the university. In most situations, such

action is not a realistic expectation. For the majority of institutions, the fifth year would be the most efficacious location for such study.

John Goodlad (1990a) called for a total commitment to rethinking and revamping teacher preparation in the United States.

> The education of this nation's teachers is of critical importance; let us get on with it. My hope is that departments, schools, and colleges of education will not only rethink their missions but will also join collaboratively with the arts and sciences departments and nearby school systems to guarantee a robust future for teacher education. (p. 194)

The secondary PROTEACH social studies program is one example of the attempt to elaborate this process of rethinking and revamping. The results of this study show progress in the right direction.

APPENDIX A
CONDITIONAL MOVES--TSOS--DEFINITIONS

Cued Solicitation

If a teacher is conducting a class; AND
If the teacher uses conditional words or phrases (e.g. suppose, let's suppose, say, let's say, assume, let's assume, imagine, let's imagine, pretend, let's pretend); AND
If the teacher uses declarative or imperative statements in order to establish an intellectual context for students; AND
If a conditional word or phrase (or more) is used in order to introduce the intellectual context or in order to present the intellectual context; AND
If a teacher terminates his statements by providing a solicitation to which students are expected to respond; AND
If the solicitation provided is one that is to be comprehended and responded to in terms of the given context:
Then a conditional move called a cued solicitation occurs.

Cued Explanation

If a teacher is conducting a class; AND
If the teacher employs conditional words or phrases (e.g. suppose, let's suppose, say, let's say, assume, let's assume, imagine, let's imagine, pretend, let's pretend); AND
If the teacher uses declarative or imperative statements in order to establish an intellectual context for students. AND
If a conditional word or phrase (or more) are used in order to introduce the intellectual context or in order to present the intellectual context; AND
If a teacher terminates his statements be deriving a conclusion that students are to comprehend in terms of the context given by the teacher;
Then a conditional move called a cued explanation occurs.

Linked Solicitation

If a teacher is conducting a class; AND
If the teacher has used declarative or imperative statements in order to provide an intellectual context; AND
If the teacher provides a solicitation to which students are expected to respond; AND
If the solicitation is one that may be responded to in terms of the context provided by the teacher; AND

If, between the time that the context is provided and the solicitation is given to students, the teacher uses clauses that begin with conditional words or phrases (e.g. if, when, since, whenever, given, in order to, according to, supposing, saying, imagining, pretending, assuming); AND
If the clause introduced by a conditional word or phrase reminds students that as they frame a response to the solicitation they are to remember and consider the given context:
Then a conditional move called a linked solicitation occurs.

Linked Explanation

If a teacher is conducting a class; AND
If the teacher has used declarative or imperative statements in order to provide an intellectual context; AND
If the teacher states a conclusion that students are to comprehend in terms of the context that has been provided; AND
If, between the time that the context is provided and the point at which the conclusion is stated, the teacher employs clauses that contain conditional words or phrases (e.g. if, when, since, whenever, given, in order to, according to, supposing, saying, imagining, pretending, assuming, therefore, hence); AND
If the clause introduced by a conditional word or phrase reminds students that they are to comprehend the conclusion derived in terms of the intellectual context provided by the teacher:
Then a conditional move called a linked explanation occurs.

Conditional Statement

If a teacher is conducting a class; AND
If a teacher uses a clause involving the use of conditional words or phrases; AND
If the use of the conditional word or phrase is neither cueing nor linking, as defined above:
Then a conditional move called a conditional statement occurs.

Hypothetico-Deductive Solicitation

If a teacher is conducting a class; AND
If the teacher uses conditional words or phrases in order to cue students that an intellectual context is being provided; AND
If the teacher uses a conditional word or phrase to link a solicitation to the cued context:
Then a hypothetico-deductive solicitation occurs.

Hypothetico-Deductive Explanation

If a teacher is conducting a class; AND
If the teacher uses a conditional word or phrase to cue students that an intellectual context is being established; AND
If the teacher uses a conditional word or phrase to link a conclusion that he derives from this context:
Then a hypothetico-deductive explanation occurs.

Note. Casteel, J.D., & Gregory, J.W. (1979). Two instruments for analyzing the classroom verbal environment. Gainesville, FL: Department of Subject Specialization Teacher Education, College of Education, University of Florida.

APPENDIX B
EXPERT TEACHER EVALUATION INSTRUMENT

EXPERT TEACHER EVALUATION OF _____

Note: Each candidate must have at least five years of teaching experience.

The teacher habitually:	+	-	?
1. Describes a new class before meeting them based on an ideal-type concept.			
2. Derives inferences about a group or individual student.			
3. Categorizes information at a high level of abstraction.			
4. Anticipates problems and opportunities by pattern recognition.			
5. Is reflective.			
6. Is deliberate in problem solving.			
7. Recognizes interactions between instructional tasks and physical and social contexts.			
8. Uses materials in original manners.			
9. Is secure in use of regulatory strategies.			
10. Uses contingency plans with composure and no loss of momentum.			
11. Diagnoses student problems and use feedback.			
12. Uses time efficiently through established routines.			
13. Focuses on instruction rather than management.			
14. Establishes classroom environment that is both nurturing and demanding.			
15. Speaks fluently when discussing instructional contexts.			
16. Frames valid arguments.			

+ indicates that teacher possesses the characteristic.
- indicates that teacher does not possess the characteristic.
? indicates uncertainty on part of evaluator.

APPENDIX C
SURVEY PLANNING QUESTIONNAIRE

Introduction: The purpose of this research is to investigate how teachers think about the various facets of what they do. During this interview we will be discussing planning-- in particular, your plans for the next week in one specific class period. These plans may be the same or different from the rest of your classes, so please confine your answers to that specific class. Please realize that there are no correct or incorrect answers to these questions. Your answers will be kept strictly confidential. Your name will never be used. Do not feel rushed in your answers. You may have as much time as necessary to supply complete answers. Do you have any questions?

For the record, which class would you like to discuss?

1. We are discussing your ____ period class. What content do you plan to teach during this week (this next week)?

2. Let's assume that your students attend class, engage cooperatively with the tasks you assign, and reflect on their experiences. Given these conditions, what do you hope your students learn?

3. What criteria did you use in order to select the appropriate content for this week's lessons?

4. Readiness is important for students at all levels of study. How did you determine that your students were ready for the lessons you will teach this week?

5. It is always possible to attempt to teach too much or too little content in a given period of time. How did you determine how much content would be taught during this week?

6. How will the work during this week be related to the past and future experiences of the students in your class?

7. There are a wide variety of materials available to use in the teaching of the social studies...maps, texts, films, etc. What materials do you plan to use during the course of this week?

8. Activities are a critical component of teaching. What activities will you emphasize during the week?

9. Alternative formats of participation (such as cooperative learning groups) tend to be functional for different purposes. What social participation structures have you planned for this week?

10. How do you plan to assess the success of your students in learning this weeks' material?

Now just a few questions about yourself. These will be used solely for demographic analysis of the data.

1. What is your current age? (If necessary) Would you say you were in your 20s, 30s, 40s, 50s, 60s?

2. How long have you been teaching? How long have you been in your current position?

3. Did you enter teaching immediately after college, or did you have a previous career?

4. What is your highest academic degree? (When? Where? In what field?)

5. How many academic credits do you have beyond the bachelor's degree?

6. When was the most recent of those credits?

7. Do you currently belong to any professional organizations such as NCSS or FCSS?

Thank you so much for cooperating with this study.

APPENDIX D
FPMS PLANNING QUESTIONNAIRE

1. What do you plan to teach in this period of instruction?
2. What should the students know or be able to do as a result of instruction over this content?
3. What factors were considered in selecting content for this lesson?
4. How did you determine that students were ready for this lesson?
5. How did you decide how much content would be taught in this period of instruction?
6. How is this content related to previous and /or future lessons?
7. What elements of content will be emphasized in the lesson?
8. What materials are to be used for instruction and why were these selected?
9. What preparation of materials is required prior to the beginning of the lesson?
10. What plans have you made for managing materials during instruction?
11. What activities will be included in this lesson and for what purposes?
12. How will you conduct each of these activities?
13. What is the sequence of activities to be used in this lesson?
14. How will the class be organized for instructional activities?
15. How will you determine that the intended learning has taken place?

Florida State Department of Education. (1983). Domains of the FPMS. (ERIC Document Reproduction Service No. 283 777)

APPENDIX E
CONDITIONAL MOVE WORD CUES

ACCORDING TO
ASSUME
ASSUMING
GIVEN
HENCE
IF
IMAGINE
IMAGINING
IN ORDER TO
LET'S ASSUME
LET'S IMAGINE
LET'S PRETEND
LET'S SAY
LET'S SUPPOSE
PRETEND
PRETENDING
SAY
SAYING
SINCE
SUPPOSE
SUPPOSING
THEREFORE
WHEN
WHENEVER

APPENDIX F
FLORIDA LAW REGARDING GENERAL AND PROFESSIONAL PREPARATION

6A-4.006 General and Professional Preparation. Credit in general and professional preparation as listed below shall be required for the professional certificate unless exemption for a specific certification subject is provided in State Board Rules.
(1) General preparation. Forty-five (45) semester hours in general preparation with not less than six (6) semester hours earned and not more than twelve (12) semester hours counted in each of the five areas listed below. A graduate with a bachelor's or higher degree from a standard institution shall be considered to have met the general preparation requirements.
(a) Arts of communication.
1. A minimum of six (6) semester hours shall be required in English composition, rhetoric, or grammar.
2. Up to six (6) semester hours in speech, journalism, or elementary foreign languages may be used to meet the total of twelve (12) semester hours permitted in this area.
(b) Human adjustment. A minimum of six (6) semester hours shall be required in areas such as: health, physical education, psychology, religion, philosophy, logic, ethics, nutrition, problems of living in home and family, or community living.
(c) Biological science, physical sciences and mathematics. A minimum of six (6) semester hours shall be required. Credit may be earned in comprehensive courses or separate subjects. The entire six (6) semester hours shall not be in mathematics.
(d) Social science. A minimum of six (6) semester hours shall be required. Credit may be earned in comprehensive courses or in separate subject, provided credit is earned in at least two (2) of the following: geography, history, political science, sociology, anthropology, or economics.
(e) Humanities and applied arts. A minimum of six (6) semester hours shall be required. Credit may be earned in comprehensive courses or in separate subjects, provided credit is earned in at least two of the following: literature (English, American, world), literature written in a foreign language, music, technological skills, construction design and fine arts, or art as applied to personal and family living.
(2) Professional preparation. Twenty (20) semester hours in professional preparation as specified below. Professional preparation shall not be required for issuance of a professional certificate covering only school food service.
(a) Course requirements in education.

1. Six (6) semester hours in foundations of education with credit in both sociological and psychological foundations as described below:
a. Sociological foundations include courses such as school and society, introduction to education, history of education, and principles and philosophy of education.
b. Psychological foundations include courses such as educational psychology, child psychology, adolescent psychology, psychology of learning, and growth and development of the individual.
2. Six (6) semester hours in general methods of teaching, administration, and curriculum in the elementary school or secondary school. Courses should provide an overview of the entire school program and give specific help with respect to the principles of teaching, general curriculum, instructional design, testing and measurement, evaluation of the school program, general methods, school organization and administration needed by teachers in the public schools.
a. Three (3) of the six (6) semester hours shall include the level of certification, such as preschool, primary, elementary, middle grades, or secondary.
b. Credits shall include both the elementary and secondary levels for PK-12 or K-12 subjects.
3. Special methods.
a. Grades K-12. Four (4) semester hours in methods of teaching the subject to include credit at the elementary and secondary levels for each of the following subjects: art, computer science, foreign languages, health, humanities, and music.
b. Middles grades (5-9) and secondary (6012). Two semester hours in methods of teaching the subject at the appropriate level for each middle grade or secondary subject.
c. Special instructional service fields. Credit in special methods of teaching in the field is not required for special instructional service fields such as educational leadership, school principal, professional school principal, guidance and counseling, educational media specialist, school psychologist, and school social worker.
(b) Practical experience in teaching. Practical experience in teaching may be satisfied by one (1) of the plans listed below:
1. Six (6) semester hours earned in a college student teaching program or in a supervised internship completed in an elementary or secondary school, or

2. Two (2) years of full-time teaching experience as specified in Rule 61-4.002(5)(a), FAC. Specific Authority 229.053(1), 231.15(1), 231.17(1) FS. Law Implemented 231.01, 231.145, 231.15, 231.17 FS. History-Amended 4-20-64, 4-8-68, 7-768, 4-11-69, 6-17-73, Repromulgated 12-5-74, Amended 10-12-76, 7-1-79, 11-5-84, Formerly 6A-4.06, Amended 9-12-89.

Note. Florida State Board of Education. (1989). Administrative Rules. Tallahassee, FL: State Board of Education.

APPENDIX G
TRANSCRIPT OF INTERVIEW #105

1. We are discussing your ____ period class. What content do you plan to teach during this week (this next week)?
****
We will be / completing the events leading to the Civil War / and introducing the Civil War.

2. Let's assume that your students attend class, engage cooperatively with the tasks you assign, and reflect on their experiences. Given these conditions, what do you hope your students learn?
**
I hope that / they will be able to understand and connect the events that led to the Civil War. / They have already learned about the economic as well as social reasons for the divisions between North and South and / how slavery brought those divisions to a kind of flash point. And so what they'll be able to do is / to understand how that issue of slavery created situations in which the North and South had to compromise and failed to do so...and created an environment for the South that they had to leave to survive. That understanding.

3. What criteria did you use in order to select the appropriate content for this week's lessons?
*****
First of all,/ I knew where we wanted to be at the end of the year and that was to understand the Civil War. / *In order to* understand the significance of the Civil War, they needed to understand what led to the Civil War and we've been pointed all year from the colonies towards this conflict. / *So* the materials that were selected that would be best suited to having them understand that series of events...and relate them to what they've learned before.

4. Readiness is important for students at all levels of study. How did you determine that your students were ready for the lessons you will teach this week?
****
OK, really / daily comprehension checks. We do reviews before we start, reviews before we end each class period. / I get a really good feeling about asking specific questions to specific students where they are as far as understanding is concerned. As far as formal tests, / we have one about once every two weeks. Of course, I learn a great deal *when* the

tests come through but the test really end up being more an affirmation of what I've suspected all along as we've done it. / *I would say* it's just the amount of participation, the daily give and take between students and students and myself that allow me to know that their understand.

5. It is always possible to attempt to teach too much or too little content in a given period of time. How did you determine how much content would be taught during this week?
*
Well / I determine based on last year...based on experience. / I always plan too much. It seems to be anyway. Plenty to do. / I also know that some classes are going to get way ahead of other classes so sometimes I have to cater the specific lesson to the specific class. / But I look far enough ahead to know where I want to end so that by the time all those adjustments are made, they are all at the same place at the same time. So basically, I can't think of the last time I undertaught. But just based on experience.

6. How will the work during this week be related to the past and future experiences of the students in your class?
*
Well, it's tied directly to it. When we started the unit on events leading to the Civil War / I gave them about five minutes to work in pairs to recall every word or phrase or concept that came into their mind that they could associate with the North or the South. They came up with a whole bunch of lists going way back into the colonial days...the names of people. Then we went through together and made a big list on the board which helped them begin to recall what they knew about the two sections...and then we pinpointed where areas--economics, geography, people's feelings, or ways of life--big categories out of little ones. By the time we were finished we had recalled what we knew about the differences and that enabled them to get ready to understand how those differences could kind of boil over *when* they were focused on slavery. / Then we went right into understanding what slavery was all about and why the abolitionists would want to abolish it. / Then from the abolitionists we related the events in the Civil War back to our unit on Westward expansion in which they knew the problems regarding the west were primarily based on determining whether those territories or new states would be slave or free. / So again, *whenever* we start anything new we go back and recall as much as we can about what we've learned and then we recall as much as we can about the new subject before we've learned it...and they know alot about this stuff that they didn't realize. So once they have that on their minds, *then* it's easy to fill them with knowledge.

7. There are a wide variety of materials available to use in the teaching of the social studies...maps, texts, films, etc.

What materials do you plan to use during the course of this week?
**
/ We'll use the text book. / We'll use maps that I created for them to refer to as far as relating this to the various compromises in the territories that were concerned. / I created a time line in which they need to place these events in order and then explain the parts or describe what happened during these events and or parts of the acts or compromises and then be able to describe the results and the Northern or Southern reaction to it. It's like a chart that they are filling in cooperatively and that was teacher-created. I have interspersed within that timeline / video segments from the PBS series the Civil War, highlighting slavery, highlighting abolitionists. On Friday, / we're going to do a kind of review on the events and I've got a segment for that that we're going to use, highlighting John Brown, the Kansas-Nebraska Act. So really what I try to do, if possible is to / intersperse as much different types of material that I possibly can when we instruct the Civil War, half of that unit will be devoted to / Glory. We'll spend six days viewing that film, / writing diaries as members of the Black regiment, / having time to discuss the issues that are raised by the film and they'll have a / map to trace their movements and before we do that, of course, we'll go to the basics concerning the / makeup of the two sides in the Civil War and the significant battles with other pictures and videos that I'll use along with the textbook to do that.

8. Activities are a critical component of teaching. What activities will you emphasize during the week?

I would say that the other ones will be similar to the ones I've already talked about. / We'll do something similar to the timeline with the Civil War battles. There will be a /chart of battles which we will use to know what they were, where they were, and their significance.

9. Alternative formats of participation (such as cooperative learning groups) tend to be functional for different purposes. What social participation structures have you planned for this week?

I think we have pretty much covered that already. / Groups, pairs, whole class work...we'll be doing a bit of it all.

10. How do you plan to assess the success of your students in learning this weeks' material?
*
There'll be a / comprehensive test on this unit...on the events of the Civil War. There'll be a comprehensive test on the Civil War. There'll be their / written work which they turn in on the assigned day. The kids keep a folder in class

that has all their assignments in it and they earn points each week for completing their assignments. So I grade these folders every week, which means / I am constantly going through their production, which gives me an idea of what they are accomplishing. Of course *when* we are in the Civil War, they'll have / a diary which will count a significant amount of points and I'll be able to judge what they've grasped from the Glory viewing.

Note.
Examples of *conditional logic* are in italics.
Use of wait time are indicated by ***. One * equals one second.
Examples of ideational fluency are indicated by /.

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BIOGRAPHICAL SKETCH

Dennis Banks was born in Pine Bluff, Arkansas, on May 5, 1949. The son of Robert and Selma Banks, he grew up and attended public school in that same community. He obtained a bachelor's degree in social and behavioral sciences from The Johns Hopkins University in December, 1970. He completed his Master of Arts in Teaching at Jacksonville University, Florida, in August of 1985. His area of specialization was social studies education. From 1984 to 1989, he taught a variety of social studies courses at Allen D. Nease Jr.-Sr. High School, near St. Augustine, Florida. From 1987 to 1989, he also served as department chair and director of student activities. In 1989, he began his doctoral studies in social studies education at the University of Florida in Gainesville. Since January, 1992, he has been an assistant professor of social science education at the State University of New York-College at Oneonta.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

J. Doyle Casteel, Chair
Professor of Instruction and Curriculum

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Eugene A. Todd
Professor of Instruction and Curriculum

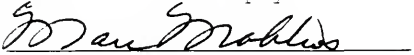
I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Robert G. Wright
Associate Professor of Instruction and Curriculum

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

M. David Miller
Associate Professor of Foundations of Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



Marc C. Mahlios
Professor of Instruction and Curriculum

This dissertation was submitted to the Graduate Faculty of the College of Education and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

December, 1992

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Dean, College of Education

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Dean, Graduate School